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THE

PRACTICE OF MEDICINE.

VOL. II.

SEVENTH EDITION.

THE

PRACTICE OF MEDICINE.

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THE

PRACTICE OF MEDICINE.

PART V.

DISEASES OF THE HEART AND GREAT VESSELS.

INTRODUCTION.

The heart supplies the motive power by which the blood is carried through the lungs and system, and as the nutrition and proper functional activity of every part and organ are dependent on the due supply of blood, diseases of this organ are attended not only with danger to life, but with serious consequences of the most varied kind. It may be said to consist of two hearts, pulmonic or right, and systemic or left, each having a receptive and an expulsive cavity, named the auricle and ventricle respectively, and the movement is communicated to the blood by the successive contraction or systole [Συστίλλω = to contract], and dilatation or diastole [Διαστέλλω = to dilate] of the ventricles, the valves at the auriculo-ventricular openings by which the blood enters the ventricles, preventing its return into the auricles during the systole, and those at the arterial orifices by which it is expelled, preventing its return into the ventricles during their diastole. The auricles, while mainly acting as reservoirs for the blood arriving by the systemic and pulmonary veins are not absolutely passive; their walls, though comparatively thin, are muscular; and when distended they contract and drive on their contents into the ventricles. A cardiac revolution, as it has been called, may be thus described:—Beginning at the moment of repose about the end of diastole, the ventricles are dilated but not distended, and are full of blood which has entered from the auricles, the auricles also are full with the great veins leading to them; at this moment the heart has a generally rounded appearance, and the apex in particular is less pointed; the auricles, and especially the right, bulge out, and the auricular appendices are seen projecting forwards round the pulmonary artery and aorta. The auricles now suddenly and swiftly contract, sending their contained blood into the ventricles, which themselves immediately contract more slowly but with far greater energy, driving the blood into the arteries. During the ventricular systole the apex of the heart is twisted to the right and tilted forwards, giving rise to the apex-beat, while the right ventricle, the part of the heart in contact with the thoracic parietes, communicates a push or impulse which may usually be felt between the apex-beat and the sternum. At the same moment the segments of the mitral and tricuspid valves, which when free to move, spontaneously take up a position closing the orifice in consequence of the disposition of the elastic fibres at their auricular surface, are forced into close contact, rendered tense, and made to bulge into the auricles by the pressure of the blood, so that from this, and from the continuous arrival of blood by the veins, the auricles are at once again distended. The end of systole thus finds the auricles full, while the ventricles are contracted and empty, and the body of the heart is angular and the apex pointed. The ventricles now suddenly relax, exercising a certain amount of suction power, and partially unloading the auricles; while for the remainder of the diastole both auricles and ventricles are passively distended by the blood flowing in from the veins till the moment arrives for a new systole.

On practising auscultation over the cardiac region we can detect two sounds, very quickly following each other. They are succeeded by an appreciable period of silence. If the time occupied by the sounds and the pause be divided into fifths, we shall find the first sound occupying two-fifths, the second sound rather less than one-fifth, and the pause rather more than two-fifths. The *first sound*, sometimes called the systolic or inferior sound of the heart, should be listened to over the apex: it is dull, booming, and prolonged, and is coincident with the systole of the ventricles, and impulse of the apex against the thoracic parietes. The *second sound*, often termed the diastolic or superior sound, is best heard about the middle of the sternum: it is short, abrupt, and clear; and is synchronous with the flow of blood from the auricles into the ventricles, the diastole of the ventricles, and the retrocession of the apex.

All physiologists agree in regarding the *second sound* of the heart as due to the brisk tension of the semilunar valves at the orifices of the aorta and pulmonary artery, to which must be added tension of the walls of these great vessels. The cause of the *first sound*, however, has long afforded a subject for controversy. By different eminent authorities it has been said to be due, entirely or partially, to the following:—The collision of the particles of blood with each other, and with the heart's parietes. The rush of blood through the narrowed openings of the great arteries. The impulse of the heart's apex against the thoracic walls. The tension of the auriculo-ventricular valves, and the muscular bruit, produced by the contraction of the muscular fibres of the heart.

There can be little doubt that the two main elements of this sound are, one, the tension of the auriculo-ventricular valves and their chordæ tendinæ; the other, the sudden tension of the muscular walls of the heart at the moment of contraction. The latter factor is not the *susurrus muscularis,* which is a continuous rumble, but a sound of a different character, which may be illustrated by placing the stethoscope on the flexor muscles of the forearm, and throwing these into sudden powerful contraction. The two elements can be partially discriminated in the normal state of the heart, and in disease one or other may predominate—the valvular when the heart is dilated and weakened, the first sound being then short and sharp; the muscular in hypertrophy, when it is prolonged and booming.

The heart lies near the centre of the thorax but projects more to the left than to the right. It is partially covered by the lungs anteriorly, but the pericardium lies in contact with the walls of the chest to a certain extent, giving rise to dulness on percussion. The area of cardiac dulness is, however, small as compared with the size of the heart; its boundary on the right nearly corresponds with the right edge of the sternum from the second intercostal space downwards; on the left it runs near the left edge of the sternum to about the third space or fourth costal cartilage, when it turns sharply outwards, runs obliquely downwards within the nipple-line to the position of the apex beat which is in the fifth space about an inch below, and to the inner side of the nipple. The lower boundary runs nearly horizontally inwards to the sternum from the apex. The area of dulness then would comprise in addition to part of the sternum only the fourth and fifth left costal cartilages for 1½ or 2 inches from the sternum, and the third, fourth, and fifth spaces.

All the valves lie beneath the sternum about opposite the third intercostal space; the pulmonary almost directly in front of the aortic but somewhat higher, the tricuspid to the right, the mitral to the left and deeply seated near the spinal column. Fortunately for diagnosis, sounds produced at the mitral orifice are conducted by the ventricular walls to the apex, and again aortic sounds become more audible when this vessel has escaped from under cover of the pulmonary artery and lies near the anterior wall of the chest at the second right intercostal space.

Physicians in all ages have very properly attached considerable importance to the rate and force at which the circulation is carried on. As a measure of these conditions, as well as of the quantity of blood sent forth at each contraction of the heart, appeal is usually made to the *pulse* as felt by the finger placed over the radial artery at the wrist.

The pulse is a resultant of three factors, the ventricular systole, the elasticity of the great vessels, and the resistance offered to the passage of the blood by the capillaries and minute arteries. On the ventricular systole depend the frequency, strength or force, and regularity; to the elasticity of the aorta and its main branches is due the conversion of the blood-stream from the intermittent jets in which it issues from the heart into a more or less continuous current; the capillary resistance and arterial contraction effect most important modifications which have very great significance. When the minute arteries are contracted, the resistance to the transmission of the blood brings about a condition of high tension throughout the arterial system, and the heart requires more time to force the blood into the aorta against this pressure; the pulse consequently is *long*, and unless the heart is acting feebly, *hard* or firm; in extreme cases the radial artery can be rolled under the finger like a cord, even when there is no degeneration in its coats. The most frequent and striking illustrations of this condition are met with in contracted granular disease of the kidneys.

When on the contrary the arterioles are large, and the capillaries unresisting, the blood shoots rapidly through them and is not detained in the arteries, the tension in the arteries is low, the heart empties itself easily and quickly into the aorta and the pulse is *short* and *soft*; it may have what is called a bounding character, for in the intervals between the pulsation the artery is emptied and flattened by the pressure of the finger, and then the sudden rush of blood conveys a sensation as of great power to the observer. This is the pulse of febrile conditions.

Now the pulse of the adult in health beats about 75 times in a minute, and some considerable practice is needed to enable the observer to appreciate the characters of each of these pulsations. But if this be true, how much more difficult must it be in disease, with a pulsation frequently occupying less than half a second? To remove this difficulty recourse has been had to mechanical appliances. Vierordt was the first physiologist to invent an instrument capable of conveying the impulse from an artery to a lever which should mark the movement on a revolving cylinder of paper. This instrument is called a *sphygmograph*. The traces made by it are regular, and mark only the extremes of dilatation and the number of pulsations in a given time. A misfortune also is that its application is difficult. Hence, endeavours were made to produce a piece of mechanism which could be easily used, and which should produce a trace representing the shades of dilatation and contraction of the vessels. M. Marey has supplied this want; and his sphygmograph, substantially the one now used, accurately and minutely records the movements of an elastic steel pad pressed upon the artery. By this instrument, placed upon the arm over the radial artery, a trace can be procured on paper showing the form and duration and regularity of the pulsations. This trace presents a line of ascent, a summit, and a line of descent, and exhibits in the pulse three elementary waves or impulses, which have been well named by Mr. Mahomed the "percussion," "tidal," and "dicrotic" waves. When the ventricles contract, all the arteries are suddenly distended, and a wave movement is propagated along the arterial system, producing the line of *ascent,* or the *percussion* wave. The more powerful the action of the heart and the more rapid the entry of blood into the arteries, the more vertical will be the ascent and the more marked the percussion wave, while it is diminished by fatty degeneration or other causes of weak or sluggish contraction, and is annihilated by aneurism. The *tidal* wave is the true pulse wave, and is caused by the expulsion of the ventricular contents into the arterial system: in the trace it is represented by the arrest in the fall of the lever after the percussion, and a more or less horizontal prolongation, or even a gentle rise. If the arterioles and capillaries are relaxed so that the blood escapes rapidly the tidal wave is short; if they are contracted so as to resist the passage of the blood the tension in the arterial system is rendered high and the tidal wave is sustained. The *dicrotic* wave, represented in the sphygmographic trace by an interruption in the descent and a more or less conspicuous secondary rise, is due to the elastic recoil of the aorta from its sudden distension by the systole of the ventricle; it is most marked in conditions of low arterial tension.

The sphygmograph is frequently of service in the diagnosis of diseases of the heart and of aneurism of the great vessels, but is of far greater value in exhibiting the degree of tension within the arterial system under various conditions. In febrile states the tension is usually low, as is shown by a short tidal wave and by well-marked dicrotism: in Bright's disease, and in conditions of the system tending thereto, the tension is high, the tidal wave being sustained and the dicrotic wave slight or absent.

I. PERICARDITIS.

Pericarditis [Περὶ = about + καρδία = the heart; terminal -*itis*], or inflammation of the external fibro-serous covering of the heart, may be regarded as a local manifestation of constitutional disease, save in those few instances where it is the result of mechanical irritation or injury. The morbid action varies much in degree in different cases; sometimes being so slight as to give rise to scarcely appreciable symptoms, while at other times both the local and general effects are most distressing.

Causes.—This disorder most frequently arises from acute rheumatism, but it is not uncommonly caused by the contaminated state of the blood produced by renal disease, sometimes apparently by damp or cold, or by mechanical injuries. As regards acute rheumatism, probably one case in nine or ten will be complicated with pericarditis. The tendency to cardiac complication in rheumatism diminishes with increase of age after fifteen. Dr. Ormerod reduces all cases of pericarditis to two classes:—1. Rheumatic pericarditis; 2. Non-rheumatic pericarditis. In the first, the disease is always well-marked, it is associated with affections of the joints, women appear rather more subject to it than men, it is most common in the young and delicate, and it is rarely directly fatal. With respect to the second, the inflammation occurs at a later period of life, is most common in men, occurs most frequently in bad constitutions, and is very often the cause of death. Non-rheumatic pericarditis may be due to cancer, tubercle, incised wounds, the formation of a fistulous opening between a cavity in the lung and the pericardial sac, the extension of pleurisy to the pericardium or penetration of hepatic abscess through the diaphragm to the pericardium, &c.; or it will arise from a particular constitutional cause,—disease of the kidney, scurvy, pneumonia, pyæmia, or one of the fevers.

Pathology and Morbid Anatomy.—The pericardium becomes vascular and loses its polish; it may present points of hæmorrhage. Effusion then takes place, which may vary greatly in character, being either on the one hand almost purely serous, or on the other almost entirely composed of coagulable lymph, or of a mixture of the two in any proportion. The lymph may take the form of flocculi and strings when scanty, or when abundant may coat the heart with a thick layer which by the movements of the organ becomes rough and sponge-like. The appearance has been compared to that seen when a knife is pressed on soft butter and withdrawn. In some cases—usually when there is some form of blood poisoning, it is purulent. In severe cases the muscular walls of the heart are often involved, and their substance is darker in colour than natural and more lacerable. The results when not immediately fatal may be adhesion, partial or complete, between the heart and pericardium; or the formation of layers of tough membranes, sometimes even calcareous patches. Not uncommonly complete absorption of the exudation occurs, and no trace may be left, or only opacities and slight thickenings. The white patches often seen on the anterior surface of the heart have been attributed to pressure, and have been named the soldier's and cobbler's white spot. When pericarditis has lasted long the muscular walls of the heart are liable to become weakened and undergo dilatation, which may be compensated later by hypertrophy. When adhesions have occurred the heart may remain unchanged, or become hypertrophied if the play of the organ is interfered with; occasionally atrophy has been met with.

Symptoms.—There is a considerable difference in the nature and degree of the symptoms; for while frequently they are so slight that the disease escapes detection unless specially looked for, in other cases they are strongly marked. When pericarditis comes on in the course of rheumatic fever or other acute affections, and merely a slight exudation of fibrin has taken place, or when the serum thrown out has been rapidly absorbed and adhesions early effected, there may be nothing to indicate its occurrence, or there may be only a sense of oppression in the precordial region, with tenderness on pressure, palpitation, and increased frequency, or especially an abnormal sharpness of the pulse. The respiration may also be irregular or sighing or excited. Severe pain is extremely rare unless there is pleuritic complication. When, however, there is much co-existent myocarditis, then both the local and general symptoms are rendered much more decided. Thus, in these latter instances, there will probably be high fever; pain referred to the region of the heart, often darting through to the left scapula, upwards to the left clavicle and shoulder, and down the arm; violent palpitation, the motions of the heart being tumultuous, and perceptible at a distance from the patient; irregularity of the pulse, usually with great frequency; hurried respiration; incapability of lying on the left side; strong pulsation of the carotids; anxiety of countenance; with frequently, noises in the ears, giddiness, and epistaxis. Again, when effusion takes place the heart's motion is interfered with; the patient is extremely restless and anxious; the pulse becomes frequent and small; there is dyspnœa, due partly to the enfeebled circulation, partly to the pressure on the left lung by the distended pericardium. Sometimes the patient is compelled to sit up in bed and lean forward in a position which is very characteristic. As the disease advances, there is extreme debility; with a perceptible dicrotism of the radial pulse, cough, suffocative paroxysms, and occasionally a tendency to syncope. The face is puffed and dusky and has a most anxious and distressed expression; there may be œdema of the extremities. Sometimes a state of asthma resembling that of fever may be induced, and occasionally there is violent delirium which may completely mask the symptoms of cardiac disturbance. The heart's action also becomes much weaker, the impulse irregular and trembling, and the sounds get weakened and altered in character.

The uncertainty of the general symptoms of pericarditis makes it all the more necessary that in every instance where the occurrence of this disease is feared, the physical signs which indicate its commencement should be carefully watched for. On practising auscultation we shall find, during the earliest stages, increased intensity of the natural sounds. Very early a distinct *alternate rubbing* or a *to-and-fro sound*, as Sir Thomas Watson terms it, will be audible, due to friction between the roughened surfaces of the cardiac and parietal layers. It varies extremely in intensity and in character, and is not always double or to-and-fro, but may be systolic or diastolic only in time; it commonly ceases in a few days, when either adhesion between the two roughened surfaces of the membrane takes place, or when effusion happens. Every now and again it will be noticed that the friction-sound continues here and there audible, particularly about the base of the heart, though the effusion is copious; and sometimes it may be reproduced by pressure with the stethoscope when it had disappeared, the pressure displacing the fluid and bringing the two surfaces again into contact. The exocardial friction-sound may so closely simulate endocardial murmur that it is sometimes difficult to distinguish between the two. Moreover, it is probable that a full development of the friction-sound can only take place when both divisions of the pericardium are the seat of plastic exudation.

Where serous effusion occurs, there will be a feebleness and deficiency of tone and force in the heart's sounds, probably owing to the deadening influence of the fluid surrounding the heart. There will also be increased dulness on percussion in the cardiac region; this may first be detected across the upper sternum about the level of the third costal cartilage, the heavy heart displacing the fluid to the upper part of the pericardial sac, which is moreover here distensible and superficial. As the amount of fluid increases dulness is found to the right of the lower sternum and to the left beyond the situation of the apex beat, and it may extend upwards as high as the second rib. The effusion may become so extensive as to give rise to distinct bulging of the præcordia and compression of the left lung. Sometimes a fluctuating movement is perceived with the heart's impulse, but this appearance may be produced otherwise and is liable to mislead. If the fluid does not become absorbed, we say that *hydro-pericardium* exists; a dropsical affection which sooner or later usually proves fatal. Only when the friction-sound is loud will it be sensible to the touch; since a more powerful rubbing is needed to produce a tactile than an audible phenomenon.

If we classify the physical signs and symptoms of pericarditis, the arrangement will be as follows:—(1) Sensations of friction appreciable to the hand. (2) Friction-sounds: of short duration. (3) Extension of limit of cardiac dulness: not the consequence of œdema or congestion of the heart, but of the liquid effusion. (4) Signs of excitement or irritation of the heart. (5) Signs of loss of power or even paralysis of the heart.

The sac of the pericardium is now and then obliterated, owing to adhesions between its free surfaces.

Diagnosis.—This will turn mainly on the distinction between the valvular murmurs of endocarditis and exo-cardial friction-sounds, and between dulness occasioned by hypertrophy and that from effusion into the pericardium. Frequently a friction-sound is unmistakeable; when there is any difficulty it may usually be decided whether a doubtful sound is endocardial or pericardial, by bearing in mind that a friction-sound is not conducted far from the point of its production, and is often heard over a very limited spot, while it ceases to be heard when the ear is withdrawn from close contact with the stethoscope, whereas a valvular murmur continues to be audible at a certain distance from the stethoscope, and is conveyed towards the axilla, or along the aorta, and is often heard in the back. The most conclusive test, however, is to apply pressure with the stethoscope, when a sound due to friction will be intensified and altered, and will frequently assume a to-and-fro character, while the only effect on a valvular murmur will be to render it clearer by condensing the tissues and thus improving the conduction of the sound.

Prognosis.—Pericarditis, and especially the rheumatic variety, is not so much to be feared for its immediate danger, as for the traces of permanent injury which it leaves behind. The endocarditis that so frequently accompanies it, especially produces serious mischief to the valves of the heart. Hence an individual, after apparent recovery, seldom finds himself as strong or hearty as he was before the attack: he suffers occasionally from cough and shortness of breath, together with palpitations of the heart on moderate exertion. Sometimes the symptoms remain latent for a few years; that is to say, they are not appreciable to the patient, who flatters himself that he is free from all traces of his attack. But after a time (much shorter in those who have to work hard for their daily bread, than in the well-to-do members of society) the health begins to fail; the general weakness, difficulty of breathing, and palpitations return: dropsical symptoms set in; or perhaps an attack of inflammation takes place, and proves fatal. Adherent pericardium again with its effects upon the heart walls is one of the causes of sudden death.

Treatment.—In no disease was the lancet used with a more unsparing hand only a few years since, than in inflammation of the pericardium. More extended experience has proved to us, however, that this heroic and sure method—as it was deemed—of extinguishing the morbid action, is not only uncertain, but often very dangerous. Dr. Markham well says,—"Experience has also shown us that venesection has no *directly* beneficial influence over pericarditis; and that large bleedings are prejudicial, and therefore inadmissible in this disease. Nevertheless, that small bleedings are often of very great service *in relieving the congestions of the heart and lungs*, which so often arise as consequences of and coincidently with the pericarditis, is, I think, an undoubted fact."* Then we were also taught the great importance of rapidly getting the system under the influence of mercury after bleeding; but the observations which have already been made upon this head render further remarks unnecessary here.

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* *Diseases of the Heart; their Pathology, Diagnosis, and Treatment.* Second Edition, p. 45. London, 1860.

The treatment which was first advocated in the third edition of this work, published in 1857, and which I have since continued to adopt, is that practised by many for the relief of acute rheumatism—the three principal remedies being the bicarbonate of potash in doses of thirty grains every two or three hours, opium in sufficient quantities to relieve pain and restlessness, and the vapour bath. Locally, poppy and chamomile fomentations, or very hot linseed poultices, are decidedly useful. From these agents I believe that I have seen the greatest benefit; and certainly in no instance have they been prejudicial. They give considerable relief to the patient's sufferings, without inducing debility; and they in no way complicate the symptoms. The quantity of opium which may be needed, will vary with the severity of the suffering; but usually full doses (perhaps one grain every three or four hours) are wanted. Now and then a single vapour bath suffices: in other cases it is necessary to repeat it daily, for three or four times. Alkaline drinks (F. 355, 356, 360) are also refreshing and do good. In most cases it will be necessary to administer a few doses of some purgative: the neutral salts (F. 141, 148, 150, 169) generally agree well. For pericarditis from a punctured wound, or that due to the extension of mischief from adjoining organs, any treatment beyond the administration of opium and the ordering of perfect rest, can only tend greatly to diminish the chances of recovery.

At the commencement of the attack the nourishment should be light, consisting of gruel, arrowroot, milk, and mutton broth. Directly the strength begins to fail, however, the diet must be made more strengthening; and soup, strong beef tea, and wine freely allowed. Dr. Stokes states that he is convinced patients are often lost from want of stimulation at the proper time; and he directs us to give support directly the pulse becomes feeble or intermittent, or the jugular veins appear turgid, or pallor and coldness of the surface set in, or a tendency to faint upon exertion is manifested. He says,—"It may be laid down as a general principle that there is no local inflammation whatever, the mere existence of which should prevent the use of wine, if circumstances require it. In two cases especially—namely, cerebritis and pericarditis, we find the greatest timidity in practice with respect to the use of wine. Yet even in the first case it may be required; and in the second its employment is imperative, when, as too often happens, excessive depletion has been resorted to."* Absolute repose of body and mind, in all cases, is important.

When the effusion into the pericardium is abundant, a large blister should be applied over the præcordia; or a succession of smaller blisters will perhaps answer the same purpose. The iodide

* *The Diseases of the Heart and the Aorta*, p. 88. Dublin, 1854.

of potassium (F. 31) has been advantageously administered to promote absorption. It has been proposed as a forlorn hope in obstinate hydro-pericardium, to remove the fluid by the introduction of a trocar and cannula, and several successful cases have now been recorded. M. Aran, Physician to the Hôpital St. Antoine at Paris, relates a case of pericarditis with copious effusion, in a young man aged 23, which he treated by an injection of iodine. The pericardium was punctured from below upwards, with a capillary trocar, in the fifth intercostal space, a little beneath the spot where the dulness on percussion was well marked : about twenty-eight ounces of a transparent reddish serum were removed. A mixture formed of four drachms of tincture of iodine, fifteen grains of iodide of potassium, and an ounce and a half of water, was then injected without causing any pain; a drachm or two being allowed to escape before closing the wound. The fluid having reaccumulated the operation was performed a second time, at the end of twelve days, giving outlet to forty-nine ounces of a greenish-albuminous fluid; a stronger injection then being employed, formed of equal parts (fl. drs. xij.) of tincture of iodine and water, with sixty grains of iodide of potassium. The treatment was successful.*

II. ENDOCARDITIS.

Endocarditis [from Ἔνδον = within + καρδία = the heart; terminal *-itis*], or inflammation of the whole or of a part of that delicate membrane which lines the interior of the heart and its valves, is of great interest to us as pathologists and physicians, owing to the severe organic diseases that so constantly spring from it. It rarely attacks the right cavities, except during intra-uterine life, and in the left affects chiefly the valves.

Pathology and Morbid Anatomy.—Inflammation of the endocardium is most commonly associated with acute rheumatism, sometimes with scarlatina, puerpural fever, or other acute affections, or with kidney disease. It may also occur in a gouty condition of system, when it will generally be chronic, or chronic inflammation of the valves may be the result of the continual strain upon them occasioned by certain occupations, as in colliers, hammermen, or coal heavers. Dr. Hope was of opinion that in rheumatic fever endocarditis more frequently occurs without pericarditis, than the latter without the former. Dr. Stokes has come to a different conclusion, and he places these diseases in the following order of frequency :—1. Acute pericarditis with endocarditis; 2. Acute pericarditis without endocarditis; and 3. Endocarditis without pericarditis. It is certain, however, that *endopericarditis* is more frequently met with than simple endocarditis.

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* *The Lancet*, p. 407. London, 12th April, 1856.

In endocarditis, as seen in the valves, there is at first some vascular injection, and thickening due to proliferation of the cells underlying the epithelium, but very soon so-called vegetations are observed—minute deposits of lymph, which in the semilunar valves usually form a crescent near the free edge, in the auriculo-ventricular valves stud the thin margins and chordæ tendineæ. To these, which arise from endocardial cells, will be added fibrin from the blood coagulated by contact with the roughened and inflamed structures. The fibrinous deposits may become detached either in molecular particles, or in mass, and being carried away by the blood current may become impacted in the capillaries or arteries of the brain, lungs, spleen, or other internal organs, when paralysis or gangrene, or various consequences may result. This is most likely to occur in ulcerative endocarditis. Later the usual developmental changes occur in the inflammatory products through which the valves and chordæ tendineæ become opaque, rigid, contracted, or adherent, and not uncommonly calcified, giving rise to constriction of the orifice, or incompetence of the valves; occasionally ulceration occurs, when the valves may be perforated or otherwise extensively destroyed. Sometimes again the endocardium lining the ventricle being attacked by ulceration the muscular structures may be bulged out or destroyed, giving rise to one form of cardiac aneurism. In chronic endocarditis, which has lately been shown to be largely due to strain, there is proliferation of the connective tissue elements with thickening and opacity, and later degeneration, giving rise to contraction, puckering, induration, or calcification.

Symptoms.—Endocarditis occurring in the course of rheumatic fever, or other acute disease, does not betray itself by any very marked symptoms. There will usually be some acceleration of the pulse, often an undue frequency of respiration, and a somewhat anxious expression of the face, but as a rule there is little or no complaint of pain. The heart ought therefore to be regularly examined during the course of acute rheumatism or other disease in which a liability to endocarditis exists without waiting for local indications. The disease is seldom directly fatal; its remote effects being those so much to be dreaded. When, however, endocarditis comes on as an isolated and independent affection, it is often severe and not uncommonly fatal. In very severe instances the inflammation chiefly gives rise to a sense of oppression and uneasiness at the præcordial region; while the patient prefers to lie on his back, and is restless and anxious. There will be fever, with a small and feeble and intermittent pulse; while there may be also cold sweats, oppressive dyspnœa, jactitation, and syncope. In ulcerative endocarditis, which is most liable to give rise to these marked symptoms, there will usually be also purpuric spots on the skin from capillary embolism, and sometimes blocking of larger vessels.

Physical Signs.—Upon applying the hand to the chest in simple endocarditis, the action of the heart may appear to be violent; while sometimes a vibratory thrill will be felt.

Percussion, it is said, often discovers an augmented extent of dulness in the præcordial region; this dulness being distinguished from that caused by pericardial effusion, by the beat of the heart appearing superficial instead of remote and distinct. But it is very doubtful if simple endocarditis can ever give rise to so much tumefaction or congestion of the walls of the heart, as to produce such an increased degree or extent of dulness as could be appreciated on making the usual examination.

Auscultation alone affords us any reliable information. On listening to the heart's sounds we shall usually detect a soft bellows-murmur, the most constant and characteristic of the phenomena of endocarditis. It is not always easy, however, where pericarditis exists to distinguish between an exocardial and an endocardial sound. The characteristic features of each have already been pointed out when treating of pericarditis, while when it is certain that a valvular murmur is present, it may be perplexing to determine whether this is the consequence of old or recent mischief. Supposing that during the progress of an attack of rheumatism a murmur is found where none existed before, we of course cannot be wrong in diagnosing endocarditis; but when the patient has previously suffered from acute rheumatism, and a murmur is heard when he first comes under observation, there may be considerable doubt. If the murmur is most audible over the base of the heart, the aortic valves will be the seat of inflammation, giving rise to obstruction if it be systolic, to regurgitation if diastolic. If the murmur is best heard at and to the left of the apex-beat, the mitral valve is affected. Inflammation, however, may go on for some time without giving rise to a murmur. For the further consideration of the physical signs of the various valvular lesions see the section on the Diseases of Valves of the Heart.

To recapitulate, the questions to be decided by auscultation are these:—Is the abnormal sound exocardial or endocardial? If the latter, is the murmur old or recent? Allowing it to be recent, is it aortic or mitral; or is there a double bruit owing to the valves at both orifices being affected? Primary disease of the pulmonic and tricuspid valves is so very rare, that the consideration of such need not here be allowed to complicate the points for scrutiny. Then finally, is it obstructive or regurgitant disease, or aortic obstructive and mitral regurgitant together; or aortic obstructive and regurgitant together?

Treatment.—This must be conducted on the same principles as should guide the practitioner in the treatment of pericarditis. Owing, however, to the power of ammonia in preventing deposition of fibrin, it is very advisable to administer full doses of the carbonate or the aromatic spirit of this salt, from the commencement of the inflammation.

III. MYOCARDITIS.

Myocarditis [from Μῦς = a muscle + καρδία = the heart; terminal -*itis*], carditis, or inflammation of the muscular substance of the heart, seldom occurs as a distinct affection; being generally combined with pericarditis, or with endocarditis, or with both. The morbid action, it is probable, extends from the investing or the lining membrane to the muscular substance; though our present knowledge will not justify our denying that the starting-point of the inflammation may be in the muscular fibres themselves. The walls of the left ventricle seem to suffer more frequently than other parts of the heart.

Pathology and Morbid Anatomy.—The muscular substance of the organ is at first dark-coloured; later it becomes pale and soft, the fibres losing their striated appearance, and breaking up. An abscess may result, or the wall of the ventricle may yield and form an aneurismal dilatation, or if the inflammation has been limited to small portions, these may become pale indurated patches.

Dr. Latham met with an almost unique case of universal carditis, in which there was effusion of pus generally throughout the cardiac fibres. The whole heart on being opened was seen to be deeply tinged with dark-coloured blood, while its substance was softened. Here and there, upon section of both ventricles, innumerable small points of pus oozed from among the muscular fibres. This was the result of most rapid and severe inflammation; death having occurred after an illness of only two days.

The report of another notable instance of inflammation of the muscular substance of the heart has been published by Mr. Salter:*—In this case, the disease ran its course in seven weeks. It commenced with an acute pain in the left side of the chest; which came on when the patient was walking, lasted a short time, and recurred about a week afterwards whilst he was using the same exercise. The pain subsequently became very frequent, and was induced by the slightest exertion. When Mr. Salter first saw him, about a week before his death, there was orthopnœa, and an uneasy sensation or dull aching referred to the stomach and middle of the sternum. Venesection, calomel and opium, with counter irritation were the means adopted to stay the disease;

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* *Medico-Chirurgical Transactions.* Vol. xxii. p. 72. London, 1839.

but they were unavailing, and death took place. At the *post-mortem examination* the pericardium was found inflamed, especially in its diaphragmatic portion; its vessels were distended, and spots of ecchymosis were discovered beneath the serous membrane. The substance of the heart was moderately firm; but the left ventricle had almost entirely lost the colour of muscle, pus could be scraped from its surface, and in some parts there were cavities in the muscular substance like small abscesses.

The history of an example of acute inflammation of the muscular structure of the heart without any inflammation of the endocardium or pericardium, was detailed to the Fellows of the Royal Medico-Chirurgical Society by Dr. C. B. Radcliffe in 1865:—The patient was a strong middle-aged man. For six weeks he had suffered occasional attacks of sharp pains at the pit of the stomach, shooting thence into the left arm—attacks evidently of the nature of angina pectoris. He was well enough to follow his daily work, and to get about with little or no discomfort up to the day before his death. When first seen the indications pointed to a very weak heart. The pulse was extremely feeble and somewhat slow, but not irregular; hands cold and clammy; first sound of the heart absent; cardiac impulse against the walls of chest could not be felt; while the second sound of the heart could be only faintly heard, and several times was distinctly reduplicated. There were no murmurs of any kind. In the attempt to detect the cardiac impulse the patient winced, and complained of feeling sore at the part. On the following day he was dying. Sitting awkwardly upon the edge of a chair by the side of the bed supported by his wife, he gasped out, "I must keep as I am, I dare not stir." He had been in this uncomfortable position for ten or twelve hours. His face was pale and ghastly, large beads of sweat stood out on the forehead, while the extremities were clammy, pale and cold. The pulse had failed: the breathing was shallow and gasping and attended with a rattle, of which the significance could not be mistaken. His mind was clear and collected; he complained of sickness; and said he knew that he was dying. At the *autopsy*, twenty-four hours after death, the heart was found dilated and flabby. The muscular structure of both ventricles, and in a lesser degree of both auricles, was soft and friable and almost black. It broke down readily under the finger like hepatized lung. As seen with the naked eye, it did not appear to be fatty, but there were considerable deposits of fat about the exterior of the heart. The pericardium, endocardium, and all the valves were quite healthy, and so also was the aorta. The left ventricle contained some loose and dark clots of semi-coagulated blood: in the right ventricle were some fibrinous but not decolorized clots adherent to the walls. Upon lifting up the heart by a portion of the right ventricle, the muscular structure broke down, and tore like wet paper by the weight of the heart itself. Unfortunately no microscopic examination was made.

There seems to be some reason for believing that the muscles of the heart may occasionally be affected with rheumatic inflammation, causing sudden paralysis of the organ and death. This occurrence will possibly explain those cases of acute rheumatism, where patients have been suddenly seized with severe pain in the cardiac region, suffocative dyspnœa, insensibility, convulsions, and death; and where afterwards no appearances have been detected on a careful examination of the body to account for the abrupt invasion of the fatal symptoms. It must not be overlooked, however, that possibly in some of these cases the fatal event may have been due to the formation of a coagulum in one of the large arteries.

IV. VALVULAR DISEASES OF THE HEART.

Affections of the valves, obstructing the onward course of the blood or permitting of its regurgitation, are the most common and the most important diseases of the heart, and are indeed generally indicated when heart-disease is spoken of without other qualification.

Causes and Effects of Valvular Disease.—Most of the alterations in the internal lining membrane of the heart result from inflammation, which gives rise to a deposit of lymph upon and beneath the serous membrane. The valves thus lose their beautiful thinness and transparency: they become thick and indurated, or puckered up, or adherent to each other or to the opposite walls of the channel, the chordæ tendineæ of the auriculo-ventricular valves being often thickened and shortened, or sometimes broken. The valves again may exhibit atheromatous or calcareous degeneration, sometimes in an extreme degree, or become covered with warty vegetations or excrescences, or they may be injured or lacerated, or they can be rendered inefficient by simple dilatation of the orifices which they guard.

The *effects* are twofold: either to contract and narrow the orifice and so obstruct the passage of the blood—*valvular obstruction;* or by puckering and shortening the valves, to render them incompetent to close the orifice, and hence permit of regurgitation of blood—*valvular insufficiency*, *regurgitant disease of valves*, &c. There may be only valvular obstruction or valvular insufficiency in any given case; but often these conditions coexist.

Diagnosis.—In the diagnosis of the diseases under consideration attention must be directed, firstly, to the physical signs; and secondly, to the chief functional symptoms.

The average frequency of *respiration* in health, in a state of mental and bodily rest, is 18 in the minute, in the adult; taking the pulse at somewhere between 72 and 80. This ratio is not only easily disturbed by disease, but also by mental emotion and other agents. To show the extent to which the pulse-respiration ratio is altered in disease, cases of fatty degeneration of the heart may be instanced. Thus, in this condition the ratio will often be as 1 : 2, with such numbers as $\frac{18}{36}$, or $\frac{20}{40}$. In most forms of embarrassed cardiac action the respirations are unduly frequent. The difficulty of breathing varies from the slightest dyspnœa to the most severe orthopnœa. Often it is the principal source of suffering, preventing the sufferer from lying down, and giving rise to most restless nights. In cases of heart disease where the victim is able to pursue his ordinary avocations to a certain extent, any undue exertion will often produce an attack of dyspnœa. This, however, is seldom noisy, as it is when the bronchi or pneumogastrics are pressed upon or irritated by an aortic aneurism.

The natural *sounds of the heart* are modified and changed, causing either sound or both to be accompanied or to be supplanted by a noise which has been aptly compared to the blowing of a pair of bellows: hence it is termed by us a *bellows-murmur*, and by the French a *bruit de soufflet*. A bellows-murmur may be harsh, or rough, or cooing, or whistling, or musical; but these modifications are of little importance. For of whatever nature, the important point to remember is, that this bruit is caused either by the presence of obstructions or imperfections (the consequence of disease or malformation) which on the one hand impede or break the free current of blood through the heart and its great vessels, or on the other permit of regurgitation into a cavity from which it had been expelled—producing an *organic* murmur; or else it is occasioned by a change in the composition of the blood, or a clot in one of the heart's cavities—giving rise to an *inorganic*, or *functional*, or *hæmic* murmur. When the valves of the heart are affected so that they act ineffectively, an organic bellows-murmur must result.

The arteries may also become the seat of murmurs. When the calibre of a vessel is much increased so that the direction of the blood-current is altered, or when the capacity is diminished so that there is increased friction of the blood against the coats; when the coats of the artery are diseased, with or without aneurism; and when there is some direct communication between an artery and a vein,—in all these cases an *organic* murmur results. A *functional* or *hæmic* murmur is due either to altered composition of the blood, or to the formation of a clot in the vessel.

A murmur is frequently audible in the subclavian artery, especially in men engaged in hard muscular work, caused by pressure upon the vessel by neighbouring parts; it can usually be produced or removed at pleasure by changing the position of the shoulder. During the early stage of phthisis again a murmur may sometimes be detected under the left clavicle, owing probably (as before mentioned) to the pressure of the tubercles upon the left subclavian artery; while not uncommonly a systolic bellows-sound is heard in the second left intercostal space over the pulmonary artery, the heart and the pulmonary artery being quite healthy. Moreover, displacement of the heart, owing to adherent pericardium, or to intra-thoracic tumours, or to the pressure of pleuritic effusion, ascites, &c., may give rise to a loud murmur which does not disappear until the organ is restored to its natural position, by the removal of the fluid; though it must be confessed that a bruit under the latter circumstances is a rare event, for I have frequently looked in vain for it when the heart has been pushed considerably upwards by the presence of an ovarian tumour, or by pregnancy advanced to the full term.

The loudness and distinctness of organic cardiac murmurs are not proportionate to the extent of disease causing them, for sometimes an exceedingly small vegetation on one of the valves will produce a very loud murmur. Dr. C. J. B. Williams had a man, thirty years old, under his care, in whom there was a very loud murmur following the second sound; which murmur, though most distinct in the mid-sternum, was also heard in every part of the chest, in the arteries of the neck, and even slightly in the radial. The man caught typhus fever, from which he died; and at the post-mortem examination it was found that the valves were all healthy except the aortic, while in these the only change was that one of them had the free margin neatly retroverted so as to leave a small smooth chink for regurgitation. The ventricles were also moderately enlarged and thickened.

The lining membrane, valves, and orifices of the left side of the heart are much more frequently diseased than those of the right. "Practically, in at least nineteen out of twenty cases," says Dr. Harvey, "the questions to be determined are, whether it be the mitral or the aortic value that is diseased, or both; and whether the disease be of the nature of valvular obstruction, or of valvular insufficiency, or both."* Diseases of the left side chiefly affect the arterial pulse, giving rise to irregularity and inequality; those of the right side affect the venous circulation, causing regurgitation into the jugular veins—a condition known as the venous pulse. Dropsy is more often connected with disease of the right than of the left cavities.

The murmurs of purely acute endocarditis are thus arranged in order of frequency by Dr. Walshe:†—Aortic obstructive; mitral regurgitant; aortic regurgitant; aortic obstructive and mitral regurgitant together; aortic obstructive and regurgitant together. Pulmonary systolic and diastolic murmurs are infinitely rare. Dr. Walshe has never observed acute obstructive mitral murmur, nor acute regurgitant tricuspid murmur.

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* "Notes on Chronic Heart Disease." *Association Medical Journal*, p. 785. 1st September, 1854.

† *The Diseases of the Heart and Great Vessels, including the Principles of Physical Diagnosis.* Third Edition, p. 248. London, 1862.

Disease of the *semilunar valves of the aorta* is not uncommon. Supposing that the affected valves diminish the aortic orifice during systole (or contraction) so as to prevent the blood from freely flowing out of the ventricle, a systolic bellows-murmur will result. This can be best heard at the base of the heart at the second right intercostal space close to the sternum, along the course of the thoracic aorta up towards the right clavicle, and even in the carotids; the murmur diminishing as the stethoscope is moved towards the apex of the heart. If the valves close imperfectly, permitting reflux of blood from the aorta, the murmur will be diastolic, will accompany the dilatation of the ventricle, and will be heard at the second right space and obliquely downwards and to the left along the course of the refluent blood, sometimes being heard very distinctly over the lower end of the sternum, sometimes more loudly in the direction of the apex. The short, second sound of the heart will also be muffled and indistinct, and will be inaudible in the neck. Sometimes we have both these conditions of the aortic valves in the same case—aortic obstruction and regurgitation together; a double bruit or bellows-murmur being then produced. The pulse of aortic disease is regular. In obstruction it is small and prolonged, giving a sphygmographic trace of small amplitude, sloping ascent, round top, and unbroken gradual fall. In the regurgitant form it is often peculiar, being generally sudden and sharp, and without any prolonged swell of the artery; Dr. Hope calls it a jerking pulse. It has also been called a collapsing pulse, from the sudden emptying of the vessel, and a hammering or even sledge-hammer pulse, from the forcible sensation communicated to the finger; while pulsation is usually distinctly visible in all the large arteries and in the radial at the wrist, becoming more conspicuous in the latter situation when the arm is raised, when also it is commonly audible. The sphygmographic traces of such a pulse are said to show certain peculiarities. There is a great amplitude of trace. The line of ascent is vertical. The curve usually presents a pointed summit. This vertical line of ascension and pointed summit are not peculiar, however, to aortic regurgitation; similar appearances being produced in functional disturbance from anæmia. But when the valvular incompetency is so great that there is free regurgitation, the descending line of the curve shows a sudden fall with an absence of dicrotism; the aortic notch being more or less suppressed, since the closure of the aortic valves which produces it is imperfect.

The *mitral valve* which guards the left auriculo-ventricular orifice, may become thickened or ossified and its tendinous cords shortened; the effect of which is to prevent its closing the auricular orifice during the ventricular systole, so that regurgitation of blood from the ventricle into the auricle occurs; or the two divisions of the valve may be puckered and more or less adherent to each other, so as to hinder their lying flat against the walls of the ventricle and thus prevent the blood from passing freely into this cavity during the diastole. In some cases the orifice is reduced to a mere oval slit. A double bruit may perhaps be detected, but this is rare. The murmur or murmurs can be best distinguished towards the apex of the heart, on the left. When there is *mitral regurgitation* the murmur is *systolic* and of maximum intensity at or to the left of the apex, but it may be heard over a great part of the heart and can frequently be heard clearly behind—between the scapula and the spine, or at the lower angle of the left scapula. The pulse is irregular in frequency and force and usually soft and frequent. If the orifice is narrowed so as to cause *obstruction* to the flow of blood from the auricle into the ventricle, the murmur, if one is present, which is not always the case, is *presystolic*, as it is heard towards the end of the diastolic interval at the moment when the auricle contracts to complete the distension of the ventricle, and leads up to the first sound. It is usually most distinctly audible rather to the inner side of the apex, and is often accompanied by a thrill felt on palpation. This murmur is sometimes difficult of identification and is liable to be considered systolic in consequence of the first sound becoming short and sharp so as to be taken for the second. A careful comparison of the time of the murmur with that of the apex beat or of the pulsation in the carotids, which it will be found to precede, will, however, enable the distinction to be made out; or the stethoscope may be first placed over the base of the heart, where the two sounds will be heard, then on carrying it little by little towards the apex, the second sound will disappear and the murmur will be found to run up to the first. Palpation also often discovers a purring thrill. Mitral disease, whether obstructive or regurgitant, interferes with the pulmonary circulation; all the vessels concerned in which get enlarged, the lungs are constantly overloaded with blood, as the circulation through them is sluggish, and hence there is lividity with a tendency to hæmorrhage into the air-sacs. The right ventricle becomes hypertrophied and ultimately dilated; and sooner or later there will be a condition of stasis in the systemic veins, persistent congestion of the liver and often of the kidneys, with jaundice and dropsy and albuminuria.

The *semilunar valves of the pulmonary artery* are very rarely diseased; so rarely that any organic alteration in them is a pathological curiosity. When, however, a bellows-murmur can be traced from the middle of the left edge of the sternum up towards the left clavicle, and when this murmur cannot be heard in the subclavian or carotid arteries, we may assume that it originates at the orifice of the pulmonary artery. The pulse remains unaltered.

The *tricuspid valve*, guarding the right auriculo-ventricular opening, is also but seldom found otherwise than healthy. When diseased, the morbid condition will almost invariably exist in combination with aortic or mitral affection, or with both. In dilatation of the right ventricle from mitral incompetency there may be tricuspid regurgitation without change of structure, but more commonly the long continued strain on this valve will have given rise to chronic inflammation with thickening and contraction. In such cases there may or may not be tricuspid murmur, which when present will be loudest at and near the ensiform cartilage, occurring with that of mitral obstruction or regurgitation. Turgescence, with pulsation of the jugular veins at every ventricular systole, is present in those cases of tricuspid disease dependent on dilated right heart.

To determine the systolic, diastolic, or presystolic character of a murmur, the apex beat or the pulse in the carotids should be carefully noted during auscultation: if systolic, the bruit must of course be synchronous with these. The radial pulse must not be trusted to, since a variable, and sometimes considerable time is lost between the heart and vessels at this distance from it.

Inorganic or *functional murmurs* generally counterfeit aortic or pulmonic bruits as regards their position. A murmur which is best heard over the base of the heart and the great arteries, which is single and systolic, which is accompanied by an anæmic murmur in the neck, which varies in intensity under different states of the system, and which is not attended by a turgid condition of the vessels,—such may be set down as a functional bruit.

Following the plan of Dr. Harvey, the signs of disease of the valves may be thus briefly tabulated:—

Bruit:—If *systolic*, and loudest at
  Base—at right 2nd space and upwards towards neck = Aortic *obstruction*.
  Base—at left 3rd space and upwards towards middle of clavicle = Pulmonary *obstruction*—generally *hæmic*.
  Apex = Mitral *insufficiency or regurgitation*.
  Ensiform Cartilage = Tricuspid *insufficiency*.

Bruit:—If *diastolic* and loudest at
  Base—right 2nd space and obliquely downward = Aortic *insufficiency*.
  Apex = Mitral *obstruction*.

Pulse: If *regular*,
  Small and long, = Aortic obstruction.
  Full, jerking, collapsing, = ,, regurgitation.
  Soft, small, weak, = Mitral obstruction.

Pulse: If *irregular*,
  Weak, intermittent, unequal, = ,, regurgitation.

It is only in aortic and mitral regurgitation that the pulse is strikingly characteristic.

The structural and functional changes caused by valvular disease will be the following. In aortic obstruction the additional force required for the propulsion of the blood through a narrowed orifice leads to hypertrophy of the left ventricle, which, except in extreme cases, may compensate for the obstruction; but should the heart be overtaxed, there may be fatal syncope, which is however rare. In aortic regurgitation there is dilatation and hypertrophy of the left ventricle caused by the distension of this cavity by the refluent blood. It is in these cases that the heart attains its maximum size, and merits the name cor bovinum. The dilatation as well as the hypertrophy is compensatory, since a larger quantity of blood is expelled from the more capacious ventricles, a part of which returns; but as the supply of blood to the heart itself through the coronary arteries is maintained by the aortic recoil, the force of which is wasted by regurgitation of blood into the ventricle, the heart is liable ultimately to be imperfectly nourished, and thus to undergo degeneration, so that the compensation is not sustained. In both obstruction and regurgitation a considerable degree of valvular change will necessitate a considerable amount of hypertrophy, and *vice versâ,* so that the extent of hypertrophy becomes in some measure an indication of the valvular lesion, which a murmur is not. But in aortic disease of whatever kind additional stress is thrown on the mitral valve, and this may give way or become inflamed, thickened, or puckered in consequence of strain, and mitral regurgitation be superadded. Mitral regurgitation, however, is more commonly the result of primary changes in this valve, as is also obstruction. The effect of either obstruction or regurgitation here is to hinder the exit of blood from the lungs, which will lead to pulmonary congestion and its consequences. Greater force, moreover, will be required to carry the blood through the lungs, and thus the right ventricle becomes hypertrophied, the degree of which hypertrophy again becomes a measure, though very indefinite, of the pulmonary obstruction caused by the valvular lesion on the left side of the heart. There will also be hypertrophy of the left ventricle in mitral regurgitation and of the left auricle in mitral obstruction. It is from hypertrophy of the right ventricle and disease of the mitral valve primary or secondary that pulmonary apoplexy usually arises. As the right heart becomes unequal to the perfect transmission of blood through the lungs, there is systemic venous obstruction, congestion, and retarded circulation through the liver, kidneys, alimentary canal, &c., resulting in proliferation of the connective-tissue elements, and fibroid condensation, and eventually in dropsy, especially if the tricuspid valve becomes insufficient through stretching of the orifice or inflammatory changes set up by undue strain.

The symptoms to which valvular disease of the heart gives rise are chiefly those of derangement of the pulmonary and systemic circulation. Sometimes there is palpitation of the heart perceptible to the patient, and attended with a feeling of oppression, or anxiety, or a sense of breathlessness, but this is not common, and when it occurs is usually an early and fugitive symptom before the establishment of compensatory changes. Shortness of breath on exertion, especially on going up hill or against the wind, is a very common symptom. Cephalalgia, tinnitus aurium, vertigo, and syncope are occasionally complained of, particularly in aortic disease, where the compensation is inadequate, or when it begins to fail from degeneration of the ventricular walls. The most characteristic symptoms are those arising from obstruction to the pulmonary circulation, cough, and shortness of breath, gradually aggravated to extreme dyspnœa, attacks of congestion or œdema of the lungs, hæmoptysis, pulmonary apoplexy, pneumonia, effusion into the pleural cavity, the countenance flushed and dusky, the face puffed, the lips of a dark red hue, and the eyes bright. As the right heart becomes unequal to overcome the obstruction to the pulmonary circulation systemic venous stasis comes on, the liver and spleen become enlarged, the urine may be albuminous from renal congestion, hæmorrhage from the gastro-intestinal mucous membrane may occur, and dropsy eventually supervenes—sometimes early, sometimes late. These effects are most common in mitral disease, and especially when tricuspid regurgitation has been superinduced. As the various symptoms are developed the patient gets weak, nervous, and irritable: with the increased pulmonary embarrassment the rest becomes broken; if the patient falls asleep he wakes with a start, gasping for breath, and has horrible dreams. He will be unable to lie down, and while worn out for want of sleep, scarcely dares to close his eyes. The most common mode of death is by combined exhaustion and apnœa, but sometimes life is cut short by syncope or by cerebral hæmorrhage.

The prognosis has to be considered under two sets of circumstances:—When valvular disease is known to exist, but no urgent symptoms are present, and again, when such symptoms have arisen. There will be less probability of prolonged and comfortable life when more than one valve is affected. The common individual valvular lesions may be placed in the following order as regards danger:—Mitral obstruction, aortic regurgitation, mitral regurgitation, aortic obstruction; but many exceptions to this rule will be met with. A more important matter is the extent to which the function of the valve is impaired, the degree of obstruction, or the amount of regurgitation produced. The murmurs give no clue to this, but an indication is afforded by the amount of hypertrophy and dilatation which have been developed, and the perfect or imperfect character of the resulting compensation. If the enlargement of the heart is not great, and the pulse continues regular and good while breathlessness is not very readily induced, the loudest murmur may be disregarded, while if the hypertrophy is considerable, however free from inconveniences the patient may be, the prognosis is doubtful, since a large compensation implies a serious lesion, and a slight circumstance—cold, or over-exertion—may disturb the balance irretrievably. Undue loudness of the pulmonary second sound as heard at the third left space is indicative of pressure in the pulmonary circulation, and implies a liability to lung complications. Tricuspid regurgitation is always of serious import, as are also evidences of failing circulation from degeneration of the heart-walls.

A question of great moment is whether the valvular change is stationary as after a long past attack of acute rheumatism, or progressive, as it is liable to be late in life, and whether or not the patient is compelled to perform laborious work. When complications, pulmonary congestion, apoplectic pneumonia, dropsy, have set in, their extent and severity will constitute the primary prognostic indications, but the considerations given above are often valuable, and may give hope in most serious cases. Much depends on the circumstances under which the symptoms have come on: if they have appeared gradually under conditions favourable to health, and without obvious exciting cause, so as to be clearly due to the development of the effects of the valvular change, there is little or no hope of amelioration; whereas if they are traceable to cold, over-work, or other cause, recovery may often be expected.

Treatment.—In the treatment of the valvular diseases of the heart three indications have generally to be followed:—(1) To invigorate the walls of the heart, and to abate its inordinate action by tonics and sedatives—as digitalis, belladonna, the American wild cherry, hydrocyanic acid, aconite, conium, henbane, hop, and morphia; though these remedies, and especially the last, must be employed with great caution, for where there is a feeble pulse, dyspnœa, and difficult expectoration, a dose of opium may but materially hasten death. The most valuable of these agents is undoubtedly digitalis, which has been shown to render the heart's action less frequent and more powerful, while at the same time it causes contraction of the minute arteries and thus raises the blood-pressure. The diminished frequency allows the heart more rest, and the increased intra-vascular pressure drives more blood into the coronary arteries, so that the nutrition of the organ is improved. (2) To ward off or gradually relieve the results of the cardiac disease,—such as pulmonary congestion, pneumonia, hæmorrhage, congestion of the liver and kidneys, dropsy, &c. This is to be attempted by ordering a nutritious diet, and by maintaining the various secreting organs in a healthy state; saline purgatives and diuretics, repeated at proper intervals, being very valuable. When the dropsical effusion is great, much benefit may often be derived from mercury; diuretics, which had previously been useless, often causing an astonishing flow of urine directly the gums get touched. The latter effect, however, is frequently obtained with difficulty where the obstruction to the circulation is great. In anasarca of the lower extremities, small incisions in the legs, or the insertion of a small cannula beneath the skin, or deep punctures on the outer side of the dorsum of the foot give great relief, by allowing the serum to drain off; the chilly and moist uncomfortable feelings caused by the flow of fluid being best mitigated by wrapping the limbs in soft chamois leather, while the skin is protected from irritation by the fluid by smearing it with zinc ointment. (3) We must endeavour to give strength and tone to the heart, so as to assist it to do its work. There will be most hope of accomplishing this by nourishing food, perhaps cod liver oil, a duly regulated supply of stimulants, pure air, warm clothing, early hours, gentle exercise, cold or tepid salt-water sponge baths, avoidance of all bodily and mental excitement, and by the administration of tonics—especially one of the various preparations of steel.

V. HYPERTROPHY OF THE HEART.

The heart is stated roughly to be about the same size as the closed fist. The average weight of this organ in the adult male may be said to be nine and a half ounces, that of the female being eight and a half.* After the age of sixty the heart is somewhat heavier, since the thickness of the walls of the left ventricle has then become decidedly increased. The muscular parietes of one or more of the cavities may become thickened without any diminution in the size of the chamber: this is called *simple hypertrophy*. Or, as most frequently happens, the walls will be thickened and the chamber become larger than natural: this is *eccentric hypertrophy*, or *hypertrophy with dilatation*. On the other hand, the increase in thickness may be accompanied with diminution in the size of the cavity: a condition known as *concentric hypertrophy*. This last form, if not simply the result of contraction or rigor mortis, is now believed only to occur as a congenital malformation, and never as the consequence of disease.

The *cause* of the hypertrophy is usually some obstruction either to the flow of blood through the heart, or to the circulation of the blood through the arteries, arterioles, or capillaries, or to interference with the free play of the heart; whence the amplification is frequently a compensatory provision to counterbalance the impediment. The heart is stimulated to extra exertion; and in consequence it receives an extra supply of nutritive materials, by which its muscular structure is strengthened. The left ventricle is more frequently found hypertrophied than the right, and much more so than the auricles. In a heart which weighed five pounds, the walls of the left ventricle had acquired a thickness of two inches. It is not certainly known whether the increase in bulk is due to increase in size of existing muscular fibres or to the production of new fibres.

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* The weight of the healthy heart in persons from twenty to fifty-five years of age averages, in males 9 oz. 8 dr., and in females 8 oz. 13 dr. Estimates of this description are of course, to a certain extent, arbitrary.—Dr. Peacock: *Monthly Journal of Medical Science*, vol. xix. p. 211. Edinburgh, 1854.

The sources of obstruction of blood through the heart will be the different valvular diseases. Aortic obstruction usually gives rise to simple hypertrophy of the left ventricle; aortic regurgitation to hypertrophy with dilatation. It is in this condition that the size of the heart attains its extreme development. Mitral regurgitation is usually attended with some degree of hypertrophy of the left ventricle, but the reflux of blood into the pulmonary veins and the consequent obstruction in the pulmonary circulation throw increased work on the right ventricle, which becomes greatly hypertrophied. Mitral obstruction gives rise to hypertrophy of the left auricle and right ventricle. Obstruction to the circulation through the systemic arteries, and consequent hypertrophy of the left ventricle, may arise from senile arterial degeneration, but more frequently from chronic Bright's disease. In the latter case the circulation of the blood rendered impure by urinary constituents is resisted by the capillaries and by the contraction of the minute arterioles, the muscular coat of which, as Dr. George Johnson has shown, becomes hypertrophied. Obstruction to the pulmonic circulation giving rise to hypertrophy of the right ventricle, not due to mitral disease, occurs in emphysema, chronic bronchitis, and other chronic diseases of the lungs. Other causes of hypertrophy are adherent pericardium, long-continued excessive muscular exertion, dilatation from pericarditis or other cause, subsequently compensated by increase of the muscular wall. Occasionally this condition is found when no cause can be assigned, and sometimes a spurious hypertrophy occurs in which the increased thickness of the ventricular walls is due to connective tissue, and not muscular fibres.

Physical Signs.—These are increase in the area of cardiac dulness with displacement of the apex downwards when it is the left ventricle which is enlarged, to the left when it is the right ventricle. The impulse is heaving and powerful, and when the right ventricle is hypertrophied it is felt and seen between the left nipple and the sternum. If no murmurs are present the first sound will be more prolonged and less sharp, the second louder than normal.

Symptoms.—Hypertrophy being generally compensatory of some antecedent mischief, it is difficult to assign to this condition its share of disturbances occurring when it is present; there may be palpitation, dyspnœa, difficulty of walking quickly, uneasiness and pain in the cardiac region, headache and attacks of vertigo. Among the more serious effects of hypertrophy of the left ventricle is cerebral hæmorrhage, which is especially liable to occur when it is due to Bright's disease. Epistaxis is a less formidable consequence. Hypertrophy of the right ventricle may cause pulmonary apoplexy and hæmoptysis.

As the hypertrophy in these cases is an endeavour (so to speak) towards health, the increased power compensating for the obstruction to the flow of blood caused by the valvular disease, we must not unnecessarily interfere with the symptoms.

The *treatment* must consist in keeping the patient as free from undue excitement as possible, and in prescribing for his symptoms. If there be much debility, quinine or steel or both (F. 380, 394, 405), bark (F. 371, 376), or the mineral acids (F. 377, 378) had better be given; if the heart's impulse be very great, aconite (F. 330), or digitalis (F. 334), or the American wild cherry (F. 333), can be occasionally but cautiously tried; while when the dyspnœa is urgent, stimulants, especially ammonia and spirit of ether (F. 361, 367), may be had recourse to. The chief point to be kept in view is this,—that while the effects of the hypertrophy on the circulation are frequently favourable, yet too great force might possibly lead to pulmonary (or even to cerebral) apoplexy.

Dilatation of the Heart.—This may occur under three circumstances. First, there may be, as has been just shown, hypertrophy with dilatation; such a condition being known as *active dilatation*, when the expansion predominates over the hypertrophy. Secondly, we have *simple dilatation*, where the thickness of the walls is normal. And thirdly, there is *passive* or *attenuated dilatation*, the walls being thinned. This last is the only state which demands a few words.

Passive dilatation is often combined with malnutrition of the heart, and fatty degeneration of the muscular fibres; both ventricles are usually affected, though the right may be so in a more marked degree than the left; and the attenuation will perhaps be so extreme that the walls are found quite collapsed after death. Passive dilatation may be due to some exhausting disease, or to inflammation of the endocardium, or perhaps to pericardial adhesion. The chief symptoms are a small, weak, and perhaps irregular pulse; coldness and slight lividity of the extremities; with giddiness, and derangement of the digestive organs. There is a tendency to congestion of the liver, to imperfect action of the kidneys, and also to congestion of the lungs. Moreover, the patient is restless at night, gets weak and irritable, and suffers from asthmatic paroxysms (cardiac asthma): palpitation is often distressing, attacks of syncope are not uncommon, and there is anasarca followed by ascites. The physical signs are,—increased præcordial dulness, undue distinctness of the heart's sounds, the first being unduly short and sharp, sometimes irregular action of the heart, sometimes reduplication of the sounds, and generally almost imperceptible cardiac impulse. There will be no murmur if the valves remain healthy; unless the dilatation of the ventricles be so great, that valvular incompetency is necessarily caused by the orifices becoming enlarged. Antispasmodics, ferruginous tonics, and agents to promote the digestion of nourishing food, are the only remedies which afford temporary relief in this serious disease.

VI. ATROPHY OF THE HEART.

There are two forms of atrophy of the heart. One, in which the organ simply wastes and dwindles in all its parts; the other, in which the texture of the muscle suffers a sort of conversion into fat—becomes affected with fatty degeneration.

Simple atrophy occurs in connexion with many exhausting diseases,—to wit cancer, tuberculosis, diabetes, &c. The whole organ diminishes in size; so that after death it may be found to weigh about five ounces instead of nine. Minutely examined, the muscular fibres are detected pale and soft, but otherwise healthy. The treatment must be that which is demanded by the constitutional affection, of which the atrophy is merely one symptom.

Fatty degeneration of the heart is a most interesting disease, which has been already incidentally noticed. The student who wishes to study the subject thoroughly may be especially referred to the writings of Dr. Richard Quain, Dr. Ormerod, Sir James Paget, Mr. Barlow, Dr. Wilks, and Prof. Virchow.

This disease occurs under two circumstances; either alone, or in conjunction with fatty disease of other organs, as the kidneys, liver, cornea, &c. Its *diagnosis* is beset with difficulties; so that when existing alone its presence is every now and then unsuspected until after death, and after a microscopic examination of some of the muscular fibres of the heart. Valvular disease very rarely coexists; but where it does, the aortic valves appear to be more generally affected than the mitral. There is no connexion between this process of decay, and the accumulation of adipose tissue around the heart. The most prominent *symptoms* of fatty degeneration are a feeble action of the heart, a remarkably slow pulse—sometimes as low as fifty or forty-five or even thirty-five in a minute, general debility, transient attacks of giddiness or faintness, a tendency to sigh frequently, a pallid and flabby appearance, a feeling of nervous exhaustion, and a marked loss of tone, &c. Both sounds of the heart are weak, the first being especially faint; while the impulse of the apex against the chest-walls is feeble or even imperceptible. In advanced cases there are attacks of dyspnœa, produced by even moderate exertion; together with many or all of the symptoms which prevail in angina pectoris. When in addition there is a well-marked arcus senilis (due, as Mr. Canton has shown, to fatty degeneration of the edge of the cornea) the diagnosis may perhaps be facilitated; though I have long been convinced that in many cases of arcus senilis the heart is quite healthy, while the latter is often affected with fatty degeneration without the arcus being present.

Fatty degeneration of the heart seems to occur rather more frequently in men than in women: it may take place at all ages, though it happens principally at advanced periods of life: all classes of society may suffer from it. Moreover, it either exists singly, or with other cardiac diseases; and it is not uncommonly a cause of sudden death. "On opening a heart thus affected," says Dr. Ormerod, "the interior of the ventricles appears to be mottled over with buff-coloured spots of a singular zigzag form. The same may be noticed beneath the pericardium also; and in extreme cases the same appearance is found, on section, to pervade the whole thickness of the walls of the ventricle and of the carneæ columnæ." On microscopically examining these spots, their nature is revealed; they are not deposits, but degenerated muscular fibres. Instead of seeing transverse striæ and nuclei—the evidence of a healthy state—little can be distinguished but a congeries of oil-globules. The muscular fibres are also found to be short and brittle; and Dr. Quain has pointed out that the coronary arteries are often obstructed. Sir James Paget well remarks that "the principal character which all these cases seem to present is, that they who labour under this disease are fit enough for all the ordinary events of calm and quiet life, but are wholly unable to resist the storm of a sickness, an accident, or an operation."—From the foregoing it will appear that the *prognosis* must always be unfavourable. Dilatation, rupture, and aneurism of the heart are the prominent changes most frequently found in connexion with this affection.

Sometimes the fat which is normally deposited upon the heart is increased on and amongst the muscular fibres to a morbid extent; and we then speak of the condition which results as *fatty growth*. This may happen alone, or in conjunction with general obesity; or it will be associated with fatty degeneration. It is possible that the arcus senilis much more frequently accompanies these cases of fatty growth, than those of fatty degeneration. The symptoms of fatty growth, when it exists alone, are those of a heart enlarged and impeded in the performance of its functions. The pulse is permanently quickened above the normal standard, while its force is diminished.

In the present state of our knowledge, the *treatment* of a case of suspected fatty disease of the heart resolves itself chiefly into preventing further degeneration of tissue. The means to adopt therefore are—nourishing animal food, attention to the digestive organs, pure air, early hours, gentle exercise, and the use of bark or very mild ferruginous tonics. Soda water will prove useful as a drink: a little brandy or sherry may be given with it. The patient should daily take a salt-water sponging bath. Everything which can hurry the circulation ought to be avoided; while agents which weaken the power of the heart, such as tobacco, invariably prove mischievous.

Some authors object to the use of fat meats, of milk, and indeed of all oleaginous foods. But it is difficult to understand the ground on which these restrictions are recommended; since the disease is a degeneration of tissue, caused by debility or a wearing-out of the frame, rather than by an excess of power. Hence I believe that cod liver oil, cream and milk, may generally be given with great advantage.

These remarks are not meant to apply to the treatment of fatty growth with general obesity. In such cases the patient should be dieted according to the directions already given.

A *brown* degeneration of the heart is described, but it is rare, and is not characterized by any special symptoms during life.

VII. CYANOSIS.

Cyanosis [Κύανος = blue + νόσος = disease], morbus cæruleus, or blue disease, are terms applied to a condition characterized by a blue or purplish discoloration of the skin; arising generally in connexion with some deficiency in the construction of the heart.

The chief malformations are the following:—A permanence of the foramen ovale, allowing the passage of the blood between the two auricles; abnormal apertures in some part of the septum of the auricles or of the ventricles; the origin of the aorta and pulmonary artery from a single ventricle; a transposition of the origins of the large vessels from the heart, the aorta arising from the right and the pulmonary artery from the left ventricle; an extreme contraction of the pulmonary artery; or, lastly, the continued patescence of the ductus arteriosus, permitting a mixture of the bloods of the aorta and the pulmonary artery.

Three explanations have been given as to the immediate cause of the discoloration of the surface in these cases of malformation. Thus, some pathologists refer it solely to general venous congestion; others regard the intermixture of the two currents of blood as the cause; while a third class believes that it is partly due to congestion of the venous system, and partly to the intermingling of the venous with the arterial blood. The truth is probably this,—that the discoloration is owing to systemic venous congestion, but that it may be aggravated by certain malformations. On the other hypothesis it seems impossible to explain the admitted facts, that malformations permitting the free admixture of arterial and venous blood may exist without giving rise to cyanosis; while the latter is sometimes found where no such admixture could have taken place. The cause of the general venous congestion is some obstruction to the flow of blood through the lungs, or from or into the right ventricle; such obstruction frequently consisting in a contraction of the pulmonary artery or its orifice.

In addition to the discoloration of the skin, the patients who survive their birth suffer from coldness of the body (sometimes the temperature, as marked by the thermometer in the mouth, has been as low as 77° Fahr.), palpitation, fits of dyspnœa, syncope on the least excitement, &c. The tips of the fingers, and sometimes of the toes, become bulbous after a time, and the nails are often incurvated. The generative organs are frequently imperfectly formed—there is evidence of early arrest of development. Bronchial hæmorrhage and bronchorrhœa seem to have occurred in many instances. Moreover, in cases about to terminate fatally we have congestion of internal organs, and dropsical effusions. The cutaneous discoloration is generally increased by aught which excites the circulation. With some few cases the symptoms of cyanosis are not manifested until many months after birth. Infants affected with the disease generally die at a very early age; but occasionally, they live on even to the adult period. Males are notably more prone to cyanosis than females: a satisfactory explanation of this fact remains to be discovered.

The physical signs are diversified, just as the malformations are multifarious. Whatever the defect may be, however, there is frequently hypertrophy with dilatation of the right ventricle. Murmurs will of course be detected if there be valvular incompetency, or constriction of the orifices.

Under exceptional circumstances cyanosis may not come on until somewhat late in life. Cases like the following are related:—A lady, aged 38, under the care of Dr. Theophilus Thompson, was always well until she had an attack of cholera, which impaired her health: two years prior to her death she suffered from fever, and from this time was cyanotic.—Bouillaud quotes an instance, where cyanosis followed a difficult labour at the age of twenty-six.—Dr. Harrison has recorded the case of a baker, who became cyanotic at 15, after using great exertion in carrying wood.—Dr. Speer has published the history of a girl, thirteen years old, who had to fill a situation needing great exertion, and she was thenceforth cyanotic.—Dr. Reisch of Vienna has given an account of a woman, 49 years old, who always had good health until an attack of rheumatic fever with endo-pericarditis, after which cyanosis and dropsy set in. Auscultation detected a loud systolic bruit, which had its maximum intensity at the apex of the heart; the second sound being weak and indistinct. There was intense cyanosis of the face; with considerable swelling of the jugular veins, and evident regurgitation in them. At the autopsy, in addition to other morbid appearances, the valve of the foramen ovale was found imperfect, there being a crescentic opening which admitted the first joint of the little finger.

The *treatment* should be simply palliative, the organic cause being irremediable. A very nourishing diet, warm clothing, the avoidance of fatigue or undue mental excitement, and residence in a pure mild air, will give the sufferers from cyanosis every chance of life which can be afforded them.

VIII. RUPTURE OF THE HEART.

Rupture of the heart may occur spontaneously from previous disease, or it may be caused by external violence. Rupture from disease is much more frequent on the left than on the right side of the organ; whereas when it occurs from external violence we find just the reverse. The laceration most commonly has its seat in the ventricles, and in that of the left side when disease is its source. Out of fifty-two cases collected by Gluge, the left ventricle was the seat of the lesion in thirty-seven, the right ventricle in eight, the left auricle in three, and the right auricle in two cases. Rupture of the valves or their tendons is generally the consequence of a prior attack of endocarditis; whereas laceration of the muscular wall of the heart most frequently is symptomatic of fatty degeneration. Probably there are six ruptures from fatty degeneration, to one from any other cause. Laceration may also be due to an aneurism in the ventricular wall; to malignant degeneration; and perhaps hydatids, by causing atrophy of the muscular fibres, might lead to it. The rupture takes place as frequently at the apex as at the base. The immediate cause is usually some sudden strain or emotion. This accident happens more frequently in males than females; while its occurrence is rare until after the fiftieth or sixtieth year.

I have seen a case of sudden death from ulceration of the wall of the left ventricle ending in rupture, where there had been no previous symptoms of heart disease. And yet the ulcer was nearly if not quite the size of a florin; was in my opinion of a cancerous nature; and had fairly eaten its way through the tissues, the rent being one inch in length. The gentleman who was the subject of this disease was 68 years old. He had gone to bed apparently quite well; must have got up in the night; and was found dead in his chair the next morning. There could scarcely have been any suffering, for his features were calm; while a book he had been reading remained open on his lap.

Supposing that death is not the immediate result of this accident, the symptoms which indicate the occurrence of rupture are great orthopnœa, intense prostration, syncope, and convulsions.

In laceration of the valves, of the chordæ tendineæ, or of the musculi papillares, there is sudden great oppression about the præcordia, together with a loud endocardial bruit.

As regards the majority of cases, rupture of the heart kills instantaneously; not so much, however, as a rule, by the loss of blood, as by the embarrassment to the play of the heart or lungs which arises from the extravasation. In more than one instance, however, the patient has been known to survive some hours, or even days; the wound having become plugged by coagula, so that the extravasation of blood into the pericardium has taken place slowly and gradually.

IX. ANGINA PECTORIS.

This is a paroxysmal disease, first described by Dr. Heberden in 1768, who called it a *disorder of the breast;* remarking that "the seat of it and the sense of strangling and anxiety with which it is attended, may make it not improperly be called *angina pectoris.*" It is not of very frequent occurrence.

The *symptoms* of "suffocative breast-pang" consist of paroxysms of intense pain about the præcordial region, accompanied with a feeling of suffocation and a fearful sense of impending death. The pain in the breast is variously described by sufferers as lancinating, burning, or constrictive; and it often seems to radiate from the centre of the sternum to the neck, or to the back, or to the left shoulder and arm. If the paroxysm come on while the patient is walking, immediate rest is necessary; the anguish being most extreme for the time. During the attack the pulse is small and slow, the breathing short and hurried, the countenance pale and anxious, the surface of the body cold and perhaps covered with a clammy sweat, while the consciousness is unimpaired. As the struggle passes off, the patient regains his usual health, and perhaps appears perfectly well.

The duration of the seizure rarely exceeds two or three minutes; though it may last for half an hour, or an hour, or even longer. The attacks are at first brought on by exertion and occur at uncertain intervals of weeks or months; but in confirmed cases the periods of recurrence approximate more and more with each successive paroxysm, while the seizure may come on at any time: not only when the patient is walking, but even when in bed. The pain is most severe, and is attended with a feeling as if life were about to cease; the paroxysm may indeed at once prove fatal.

It necessarily follows from the foregoing, that the *prognosis* is unfavourable to a marked degree; for if death do not ensue in an early seizure, it generally does so in some subsequent attack. The disease occurs most frequently in advanced life, and is much more common in men than in women. In some few instances it has seemed to have an obscure connexion with gout; and I have read of gout and angina pectoris alternating with each other in the same individual. But I apprehend this only happens in gouty subjects who have a weakened heart, either from attenuation or from fatty degeneration.

With regard to the *pathology* of angina pectoris, it may be said that our improved means of observation have rendered it almost certain that this most distressing disorder is always associated with some important organic cardiac affection; although, in all probability, it is not connected with one form of heart disease only. In many instances fatty degeneration of the muscular fibres of the heart has been detected; a condition which, occasionally at least, seems to be connected with partial obstruction of the coronary arteries. Sometimes possibly, atheromatous deposit, or a syphiloma about the root of the aorta and aortic valves, will be found to have obstructed the coronary arteries by encroaching upon their openings. In the attack, however, there is apparently general arterial spasm which causes resistance to the circulation and throws stress upon the enfeebled heart.

Sir John Forbes, in an essay published in 1833, before the value of the microscope was appreciated, collected the histories of forty-five examples of angina pectoris, in which the body had been examined after death. In two of the cases there was disease of the liver only; in four, there was nothing morbid except an excessive coating of fat about the heart; while in the remaining thirty-nine there was found organic disease of the heart or great vessels. Of these latter cases, in ten there was organic disease of the heart alone; in three of the aorta alone; in one of the coronary arteries alone. But there was ossification, or cartilaginous thickening of the coronary arteries, combined with other disease, in sixteen instances; and there was a morbid condition of the cardiac valves in sixteen cases likewise. The aorta was diseased in twenty-four cases, and in twelve there was preternatural softness of the heart.

The *treatment* during a paroxysm consists in the administration of stimulants, such as ammonia, wine, and brandy; and of antispasmodics,—as ether, opium, chloroform, hydrocyanic acid, &c. I have found a mixture of ammonia, spirit of chloroform and of ether, a little belladonna, and tincture of cantharides (F. 85), exceedingly valuable in giving speedy relief. The patient should always carry a dose of this medicine about with him, in order that it may be taken on the least threatening of an attack. A remedy which has proved most effectual, however, is the nitrite of amyl, first tried by Dr. Lauder Brunton; the inhalation of a few drops relaxes the arterial spasm and relieves the over-strained heart. Sinapisms, turpentine stupes, hot fomentations, and liniments containing belladonna and chloroform will help to relieve the suffering.

The return of the seizure is to be guarded against by improving the general health; by constant attention to diet; by the occasional use of well-selected tonics; and by the avoidance of stimulants, strong exercise, walking soon after meals, and all mental excitement. A belladonna plaster worn constantly over the præcordial region may do good.

X. CARDIAC ANEURISM.

Aneurism of the heart was formerly said to occur in two forms:—either as a simple dilatation of the wall of a ventricle, forming the improperly called *passive aneurism* of Corvisart; or as a pouched fulness arising abruptly from the ventricle, constituting a tumour on the heart's surface. The latter is the only disease to which the designation of cardiac aneurism (or partial dilatation) should be applied. In it the tumour may vary in size from that of a small filbert to a growth as large as the fist; the sac is found to contain layers of fibrin or laminated coagula of blood, especially when its mouth is constricted, like arterial aneurisms; while it generally has its seat in the left ventricle, much more rarely in the left or right auricle, but never in the right ventricle.

According to Rokitansky there are two distinct kinds of cardiac aneurism. The first or acute variety depends upon a laceration or ulceration of the endocardium, through which the blood passes, displacing and destroying the muscular fibres, and gradually making a pouch; while in this pouch fibrin is deposited, its entrance presenting a fringed margin of endocardium with vegetations attached. The second or chronic form is the result of some inflammatory condition of the muscular fibre, or of the investing or lining membrane of the heart. The walls of the sac consist of the endocardial and pericardial membranes unbroken, while the muscular fibre seems to be replaced by a fibroid tissue. Either kind gives rise to symptoms which are uncertain and obscure. Often the passage of the blood into the sac has caused a murmur, but this has been mistaken and thought to be due to some valvular lesion. Death may occur in consequence of the supervention of extraneous disease unconnected with the aneurism, or from impairment of the heart's action; or it will happen suddenly from the wall of the latter giving way, the blood being poured into the pericardium, or into the pleura—if the free surfaces of the pericardium be adherent, as they often are in these cases.

The *coronary arteries* are now and then diseased. Fatty degeneration and ossification of their coats, obstruction of their canals, and small aneurismal dilatations of their walls are not frequent events. There may be only one aneurism; or several branches of both the right and left coronary artery, or one or both main trunks will perhaps be found dilated into a set of sacculated little tumours. With this condition, all the other vessels in the body need not necessarily be otherwise than healthy. In the instances which have been recorded there have been no symptoms during life to allow of a correct diagnosis, or sometimes even of a suspicion of heart disease; while death has occurred gradually from a progressive loss of strength and exhaustion, or suddenly from rupture of the aneurism—the pericardium being afterwards found filled with blood or in a paroxysm of *angina pectoris*.

XI. TUMOURS OF THE HEART.

Morbid growths of a benignant or malignant character in the interior of the heart are of rare occurrence, and consequently very little is known of the clinical history of these cases. Syphilitic and cancerous tumours have been known to give rise to sudden death without previous indications of their presence. In other cases the chief features which have been noticed seem to have consisted of progressive weakness, with paroxysms of dyspnœa; the latter gradually increasing, until the breathing has become permanently laborious and panting. With this breathlessness, there has been an incessant dry cough; as well as a frequent small pulse, an occasional paroxysm of substernal pain, disturbed rest from fearful dreams and nausea with disgust for food.

Examples of true *polypus of the heart* are infrequent even amongst the exceptional cases of disease. An instance has been reported by Dr. Douglas, who gives the following summary of the signs which were presented:*—The patient was a gentleman, aged 35, of large frame and development. There was a rapid development of the symptoms. A previously robust state of health. Dyspnœa, with an absence of signs of pulmonary obstruction. Persistent hurry of the circulation. Reflex nervous irritation, with a kind of hysteric breathing; paroxysmal cough without expectoration; retching, semi-convulsive attacks, and tearing substernal pain. Delayed obstruction of the circulation through the lungs, the kidneys, and the liver. Anasarca delayed, but rapidly developed. Pulse small and regular. Contrast of a more marked cardiac impulse than radial pulse. Absence of cardiac murmur. Assimilation in the "clang" of the heart's sounds. *Death* occurred after one of those semi-convulsive attacks which usually ended in syncope. At the *necroscopy*, on opening the left ventricle, the rounded nodulated extremity of a tumour was seen projecting through the mitral orifice. On opening the left auricle, this tumour was found growing from its posterior wall; of such bulk as seemed nearly to fill the cavity of the auricle, and hanging downwards, its point projecting into the left ventricle. The tumour was 4½ inches long, 2½ broad, and 1¼ deep at its deepest part. Its superficial and dependent part was coated with some layers of coagulated fibrin, and it presented nodules of a translucent appearance; but its base was organically connected with the auricular wall, and was dense in structure. On the outer side of the auricle, opposite the point where the tumour had its attachment, there were small outgrowths of a structure identical with that of the tumour itself; this structure being afterwards found rich in cells, many of them resembling connective tissue bodies, but none having the appearance of typical cancer cells. There was no coagulum in the auricular appendage, nor between the bands of the columnæ carneæ. The right side of the heart presented no abnormality. The pulmonary veins were open; and the valves of the heart were healthy.

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* *Edinburgh Medical Journal*, p. 908. No. 154, April, 1868.

Dr. Morgan exhibited at the Manchester Medical Society, in March, 1868, a preparation which he believed to be unique. The patient, 28 years of age, had suffered from one or two attacks of rheumatic fever. He had a complicated cardiac murmur, partly exocardial and partly double mitral. Death took place very gradually. At the subsequent examination it was found that the right auricle contained a *loose tumour*, about as large as a pigeon's egg, composed of phosphate of lime and fibrous stroma. This tumour had evidently grown from the wall of the auricles, had become detached, and had then rolled about in the current of blood; for both on its surface and on the inside of the wall were to be seen the remains of a pedicle. Another tumour, still small, was also in process of formation. The auriculo-ventricular valve was worn away at one part by the attrition of the substance.

In a case of rupture of the heart shown to the Pathological Society by Dr. Moxon in February, 1866, there was seen, on cutting into the substance of the septum of the left ventricle, a pale cheese-coloured *fibrinous mass*, resembling decolorized blood-clot. Dr. Moxon expressed his belief that deposits such as this, which are nearly always in the septum, are none other than clots formed in the substance of the ventricular wall by injury to the vessels, occurring in ruptures that are not sufficiently extensive to reach either surface of the wall.

According to Dr. Oppert, up to the year 1867, eight cases of *syphilomata* of the heart had been recorded in medical literature. The little tumours appear to have given rise to pain, irregular action of the heart, palpitations, dyspnœa, &c.; while sometimes a slight systolic murmur was noticed. The histories show that these growths are liable to soften, and that they may produce ulceration of the heart and embolism. Their diagnosis must be made through the presence of syphilitic affections of other organs.

Occasionally a cure can be hoped for from the use of specific remedies, provided they are employed at an early period before degeneration of the muscular tissue has set in.

Where the syphilitic deposit on the walls of the heart has taken place slowly, there has been found hypertrophy of the organ. In an instance related by Ricord, the constitutional infection was of long standing; the first sore being contracted in 1824, while death from syphilitic degeneration of the muscular fibres of the heart did not happen until 1845. Mr. Morgan, of Dublin, has published the medical history of a prostitute who had sores on the genitals eighteen years before death took place, in July, 1868, from the formation of gummata in the walls of the ventricles.

Cases of primary *cancer* of the heart are very seldom met with. Less uncommon are instances where the malignant disease has spread to the heart from adjacent organs,—from the glands in the neck, the bronchial glands, or the lungs. But most frequently where the heart is invaded by cancer, this affection has occurred secondarily: there either is or there has been malignant disease in some other organ of the body.

Cancer of the heart, whether primary or secondary, has rarely given rise to such symptoms that its existence has been diagnosed during life. In a case of this disease, which was under the care of Dr. Peacock at the Victoria Park Hospital, and in which particular attention was paid to the heart because it appeared clear that there was a tumour in the chest, and the patient stated that his father died of cancer of the heart, yet no symptoms specially indicating that the heart was involved could be detected.

The cancerous deposit, which is most frequently of the medullary kind, may be found about the pericardium, or in the muscular substance of the heart. In an instance reported by Dr. Bright, a thick layer of yellow malignant disease covered the whole of the visceral and parietal portions of the pericardium: so that this fibro-serous membrane was glued to the heart. The external wall of the right ventricle has been found occupied by a large knotted tumour, looking like a supernumerary heart, and formed of medullary cancer. In addition to masses of cancer involving the walls of the heart, the columnæ carneæ, and the musculi pectinati, we find that the surfaces of one or more of the valves may have cancerous vegetations impeding the proper closure of the openings.

XII. FUNCTIONAL DERANGEMENT OF THE HEART.

The disorder now to be considered is of special importance on account of the mental distress to which it gives rise. For it is a curious feature in medical practice, that whereas patients with grave structural disease of the heart (prior to the occurrence of the secondary evils) seldom consider that there is anything radically wrong, individuals with mere deranged action can scarcely be persuaded that they are not doomed to an early and sudden death. The latter are unable to understand how indigestion, fast living, the abuse of tobacco and tea, or severe mental labour with insufficient bodily exercise, can produce palpitation with an intermittent pulse; while the physician who assures them that there is no cardiac disease, is either regarded as one ignorant of his business, or as a good-natured fellow afraid to tell an unwelcome truth.

Functional disorder can closely simulate organic disease of the heart. There may be an irregular feeble pulse, palpitation, and fluttering; with a cardiac murmur and subcutaneous œdema in anæmic subjects. A systolic murmur, sometimes audible at the base and apex, may even be heard in a few healthy individuals under the influence of great nervous excitement. The local suffering is usually greater than in organic disease; the patient complaining either of a dull wearying ache in the præcordial region, or of occasional lancinating pains. Frequently there is inability to lie on the left side, owing to tenderness. There is always great depression of spirits; the digestive organs are deranged, flatulence and acid eructations being especially common; a sense of choking, or of the rising of a ball in the throat, is complained of; and there may be occasional attacks of giddiness, faintness, headache, noises in the ears, flushing of the face, violent pulsation in the aorta and other arteries, &c. There is rarely any dyspnœa, if the blood be healthy; and even when the breathing is hurried the patient hardly refers to it, all his thoughts being fixed on the palpitation or thumping of his heart, and the pain.

Some remarkable examples of unusually rapid action of the heart are to be found recorded in the medical periodicals. In one instance, a patient who consulted Dr. Cotton, had a pulse too rapid to be counted; the respirations were forty; while the pulsations of the heart were 230 in a minute. Three weeks after the commencement of the attack, the action of the heart suddenly became natural in every respect, and the pulse fell to 80. Four or five similar attacks took place; most of these ending in recovery while the patient was taking digitalis. Dr. Cotton believes that such rapid action of the heart, when unconnected with organic mischief or inflammatory disease or displacement, must be due either to the heart being so extremely sensitive that it contracts upon the healthy blood before the cavities have got filled; or else the blood is of such an abnormal and irritating character, that it excites premature contraction. One symptom remained after recovery from the last attack, viz. pulsation of the right jugular vein; this being probably due to the tricuspid valve allowing of regurgitation. Why the valve should continue incompetent, and should not give rise to a regurgitant murmur, are questions difficult to answer.*—A similar instance happened in the practice of Sir Thomas Watson; where the beatings, "or rather the waggings," of the heart were found to number 216 in the minute. There was no murmur. In a day or two, the inordinate action suddenly ceased, and the pulse numbered 72. During a third seizure, the attack suddenly passed off while Sir Thomas Watson was present. A fourth attack proved fatal. At the autopsy the heart was found large, as if it had been distended; while the muscular walls were very thin and soft. No other morbid state could be detected.

Another form of functional disturbance of the heart is an intermittent action. The heart beats steadily and equably for a certain number of times, and then a pulsation is missing. By very careful auscultation it can generally be made out that the contraction is not altogether absent; a feeble first sound may be heard, and perhaps a second sound in the pulmonary artery, but not in the aorta. Intermissions of this kind may be due to dyspepsia or temporary debility or to tobacco, but they may also be habitual and persist for years in individuals enjoying robust heath and living to an advanced age. This intermittent pulse is probably attributable to impaired innervation of the heart, and according to Dr. Richardson it often dates from some severe shock to the system, physical or moral.

To prevent any error in the diagnosis of functional from organic affections of the heart, the physical signs of valvular disease (as already described) must be borne in mind. Moreover, the patient ought to be examined with the greatest care; and the practitioner if in doubt, should reserve his opinion until he can make a second investigation. The disease perhaps most likely to be overlooked is fatty degeneration, especially if the pulse be temporarily hurried and the corneæ appear healthy.

Functional disturbance of the heart often occurs in cases of hysteria, ovarian or uterine irritation, neuralgia, and anæmia; it is frequently complained of by women at "the change of life;" it may be associated with the derangements due to nervous exhaustion, —such as over study, mental anxiety, sexual excesses, &c.; morbid states of the blood, gout, rheumatism, or chronic disease of the liver can produce it; the use of tobacco or strong tea not uncommonly originates it; and lastly, it is a frequent result of all forms of dyspepsia.

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* *British Medical Journal*, p. 630. London, 1st June, 1867. The case by Sir Thomas Watson is at p. 752, 22nd June, 1867.

The object of our treatment must be to allay the symptoms, while we also endeavour to remove their source. The cause of the suffering ought to be fully explained to the patient, and he must be led to feel confidence in our ability to cure him. An incipient attack of palpitation may frequently be cut short by a few deep inspirations, and nothing is more encouraging to a nervous sufferer than to find his dreaded symptom capable of control by so simple a proceeding. To quiet the circulation, antispasmodics and sedatives and special tonics will be needed. Perhaps few remedies of this description answer better than ammonia, ether, sumbul, henbane, belladonna, hop, opium, &c. (according to F. 86, 93, 95, 326, 337, 361). The officinal belladonna or opium plaster, applied over the præcordia, gives relief. Where the patient can bear digitalis, which most probably acts as a cardiac tonic, this drug (F. 334) will prove very useful. Supposing it be desirable to effect a compromise in the treatment,—to feel one's way, the American wild cherry (F. 333) can be prescribed instead of digitalis. If there be constipation with unhealthy secretions, a warm aperient (F. 146, 149, 162) should be ordered. Then, if the deranged cardiac action appear to have any connexion with gout, saline effervescing draughts with colchicum (F. 46, 348, 352) ought to be administered. Where there are acid eructations with dyspepsia, bismuth, soda or potash, hydrocyanic acid, laurel water, &c. (F. 65, 67, 70) will be necessary; followed at the end of a few days by the nitro-hydrochloric acid in some bitter infusion (F. 378). Pepsine (F. 420) frequently does good in these cases of dyspeptic misery, although it will be useless without particular attention to the diet. The patient who cannot afford time to eat his meals quietly, and to masticate his food thoroughly, must bear his troubles. The practitioner will have to see that the teeth and gums are in a proper condition. It is astonishing that people should expect to enjoy good health, while their gums are sodden and filled only with decayed teeth and useless stumps. In these days of painless dentistry and the skilful adaptation of artificial teeth, every mouth ought to be clean and sound. Supplementary to the foregoing, the use of tobacco and tea should be forbidden; while it must be remembered that malt liquors more frequently than not disagree. A small quantity of brandy in iced soda water is generally most suitable. And lastly, if there be symptoms of nervous exhaustion, or if the patient be anæmic, steel will be required. The best preparations in these cases, as a rule, are the citrate of iron and ammonia (F. 401, 403), the reduced iron (F. 394, 404), the citrate of iron and strychnia (F. 408), or quinine and iron (380).

XIII. INTRA-THORACIC TUMOURS.

An intra-thoracic tumour may be aneurismal, cancerous, sarcomatous, adenoid, fibrous or fatty; or it may be formed by an abscess. Putting aside the cases of aneurism, we find that the other tumours, whatever be their nature, commonly have their origin in the connective tissue and glandular structures, and are developed in the mediastina. The symptoms they produce are chiefly due to the pressure exerted on the heart or lungs, or on the nerves or vessels, and are exceedingly variable, differing according to the structures involved. There may be no indications of disease for a time, as a tumour often attains some size before it interferes with the circulation or the respiration.

When the root of the lung is involved, we find more or less pain, restlessness, cough, dyspnœa or even orthopnœa, frothy or viscid expectoration, palpitation, hoarseness, and every now and again hæmoptysis. The tumour may produce pleurisy, with effusion, which is often bloody when the disease is malignant, bronchitis, pneumonia, pulmonary gangrene, or if a main bronchus be obstructed, pulmonary collapse. The trachea or œsophagus may be compressed, the heart displaced; the vena cava or one or both of the innominate veins or the vena azygos may be obstructed or even obliterated; more rarely the aorta may be constricted. Dulness on percussion becomes more marked as the growth protrudes into the anterior mediastinum, and it may bulge out the ribs or sternum, or protrude through the intercostal spaces; the auscultatory signs will vary according to the nature of the secondary phenomena.

Primary hydatid disease of the lung, or of the mediastinal structures, is hardly ever met with. In cases where hydatids, or portions of their cystic membranes, are expectorated, the original seat of the parasitic growth has been the liver. At least, this has been the case with the great majority of instances.

With regard to cases of primary cancer involving the root of the lung, it is remarkable that inflammatory condensation of the pulmonary tissue, with disorganization and abscess, may result comparatively early. In the only three examples of this rare and obscure disease which fell under Dr. George Budd's observation at King's College Hospital, during nearly twenty years, the tumour implicated the root of the right lung.* The extent of change in the lung in these three cases was greater as the tumour was larger, and involved more completely the root of the lung; while in all, the left lung was free from adhesions, and presented only those appearances which result from recent congestion. As to the way in which these changes arose, Dr. Budd suggests that they resulted from the tumour involving and destroying all or a greater part of the pulmonary nerves; and consequently the inflammatory affections of the tissues of the lung in these instances are analogous to that destructive inflammation of the eyeball which results from disease involving the fifth nerve within the orbit. The lung resembles the eyeball in this respect, that all the nerves which supply it are comprised at its root in a very small space, so that they can there be destroyed or paralysed (and the organ, in consequence, be deprived entirely of nervous influence) by disease of no very great extent.

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* *Medico-Chirurgical Transactions,* vol. xlii. p. 215. London, 1859.

Mediastinal cancer is seldom primary. It may occur secondarily to disease of distant organs, or it can possibly spread from the lungs. The fatal termination in mediastinal tumour, whether this be cancerous or not, often takes place slowly; the patient's sufferings from impeded respiration, want of sleep and appetite, debility and anæmia, gradually increasing until he dies anásarcous and exhausted. Sometimes, however, death takes place almost suddenly from hæmorrhage, from thrombosis, or from spasm of the glottis. All that art can do in these very distressing cases is to palliate the prominent symptoms. Great temporary relief may, however, be often given by the cautious use of diuretics or of aperients; by dry cupping; by inunction with the ointment of red iodide of mercury (one part of the officinal ointment to three of lard), or by freely rubbing in the compound iodine ointment (equal parts of the ointment and cod liver oil); by venesection, to the extent of six or eight ounces, if symptoms of pulmonary or cardiac congestion predominate; and by employing antispasmodics,—such as ether, spirit of chloroform, ammonia, opium, belladonna, stramonium, &c.

XIV. AORTITIS.

Aortitis [from 'Αορτὴ = the great artery; terminal *-itis*], or acute inflammation of the aorta, is such a very rare affection that some physicians almost doubt the possibility of its occurrence. On all hands it is allowed that the mode of origin of the inflammation is unknown. It can only be said that aortitis is probably a blood disease.

The symptoms are so obscure, that aortitis is seldom diagnosed. In the recorded cases there seems principally to have been great general uneasiness, rigors followed by fever, orthopnœa with a frequent sense of suffocation, pain and violent pulsation of the vessel, and a great palpitation of the heart. In a very interesting case reported by Dr. Parkes,* a loud, rough, systolic bruit, due to the passage of the blood over a surface roughened by a deposit of lymph, was heard from the third dorsal vertebra down into the lumbar region; while the pulse was irregular and small, though this arose from the aortic orifice of the heart being diseased. The pulse is often unaffected.

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* *The Medical Times*, London, 23rd February, 1850.

The appearances found after death seem to consist of great vascularity, with a thickened pulpy state of the inner and middle coats of the artery. Lymph has sometimes been effused on the internal tunic. On the same membrane small yellow deposits are occasionally seen as the result of syphilis. From the few cases on record it would seem that inflammation of the aorta is very seldom associated with endocarditis,—less frequently indeed than with pneumonia or with pleurisy.

With regard to treatment, it is only necessary to say that when the existence of this disease is suspected, warm baths, dry cupping over the spine, counter-irritation by means of blisters, and the administration of iodide of potassium and opium, are the measures to be resorted to. Colchicum might perhaps do good; while ether could be tried to relieve the dyspnœa.

XV. AORTIC PULSATION.

Aortic pulsation is a peculiar functional affection which is characterized by violent throbbing, this being usually most observable in the abdominal portion of the vessel. It causes annoyance rather than pain: but at times produces sickness and syncope. The pulsation may frequently, in thin subjects, be seen at the epigastrium, and sometimes at the umbilicus. On applying the hand, a jerking, quick, strong forward impulse is felt; which is synchronous with the heart's systole. Auscultation will possibly detect a systolic bellows-murmur; such being due to anæmia, or to the compression exerted by a tumour lying over the vessel, or to displacement of the artery by disease of the vertebræ, or to simple pressure with the stethoscope. The diagnosis between functional and aneurismal pulsation is somewhat difficult, particularly if any cancerous or non-malignant growth be situated over the vessel.—I have found this pulsation not uncommon in cases of uterine disease. It has been frequently noticed in hypochondriacs, in those whose digestive organs are deranged, in structural affections of the stomach and duodenum, in gouty patients, in chlorotic females, in association with exophthalmic goitre, &c. Certain foods may also give rise to it, especially strong green tea and tobacco.

The treatment must be directed to the removal of the cause. In a case which was under my care during the year 1853, in the Hospital for Women, the pulsation produced so much sickness and distress that it was frequently necessary to control it by the application of ice to the abdomen, and by the administration of morphia. Hohnbaum, who suffered for some years from this disease in connexion with dyspepsia, says that he derived the greatest relief from the use of the aperient waters of Carlsbad, change of air, and complete relaxation from his professional duties. In most cases considerable benefit will arise from the employment of bark and some mineral acid, or from quinine and steel, or from phosphate of zinc and nux vomica; from attention to the functions of digestion; from friction along the spine with a liniment containing belladonna; as well as from sea-bathing. The diet ought to be nourishing; substituting dry sherry or brandy and water for beer, and milk (or cocoa made with milk) for tea and coffee.

XVI. CONTRACTION AND OBLITERATION OF THE AORTA.

That contraction of the aorta, sometimes going on to complete obliteration, may occasionally occur near the termination of the arch of the vessel (about the point where the ductus arteriosus is united with it), has been well known since M. Reynaud recorded an example of the kind in 1828.

From an elaborate analysis of forty cases by Dr. Peacock,* it appeared that the aorta gradually diminished in size, or the contraction commenced abruptly; that when abrupt, the vessel often looked as if a piece of string had been tied round it; that the internal tunics were frequently more contracted and thickened than the external; and that in ten instances the obliteration of the canal was complete, while in the remainder the contraction varied, so that in some only a probe could be passed through the stricture, though in others the little finger might be introduced. The ascending portion of the arch was generally dilated, whilst the coats were thickened or atheromatous or osseous; but below the seat of stricture the vessel was often dilated, and then became contracted. Although the blood had been conveyed imperfectly, or not at all, by the trunk of the aorta from the upper into the lower portion of that vessel, yet the circulation had been maintained with considerable freedom in the lower parts of the body by a compensatory collateral circulation; the collateral channels, however, affording a less free passage than the healthy vessel would have done. Hence, the changes produced in the heart consisted chiefly of hypertrophy and dilatation of the cavities, such as might arise from any form of aortic obstruction. The patients were of all ages, from a child twenty-two days old, to a man who was ninety-two; and the defect was more common in males than females. Death occurred, in one set of cases, from acute or chronic diseases, having little or no connexion with the morbid condition of the vascular system; in a second set, the death was sudden, and traceable to the condition of the aorta; while in the largest proportion, the patients sank with symptoms of cardiac asthma and dropsy, sometimes complicated by pneumonia, bronchitis, pericarditis, erysipelas, sloughing, purpura, &c. Dr. Peacock agrees with those writers who regard the stricture as originating in, or being connected with, some error in the original conformation of the vessel.

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* *British and Foreign Medico-Chirurgical Review*, vol. xxv. p. 467. London, 1860.

XVII. ANEURISM.

Three principal forms of Aneurism [from Ἀνευρύνω = to dilate] are usually described. *True* aneurism, in which all the coats of the artery dilate and unite in forming the walls of the pouch; *false* aneurism, in which the inner and middle arterial tunics being ruptured, the walls are formed by the cellular coat and contiguous parts; and *mixed* or *consecutive false* aneurism, in which the three coats having at first dilated, the inner and middle ones subsequently rupture as the distension increases. The same meaning, however, is not always attached to these names by authors, and the varieties are not distinguishable during life, not always indeed after death. When the two inner tunics are ruptured, and the blood forces its way between them and the outer coat by a kind of false passage so as to form a spreading diffused tumour, the disease is known as a *dissecting* aneurism. And lastly, *varicose* aneurisms are those where a communication has formed between the aorta and either of the venæ cavæ, or between the aorta and one of the auricles, or between this vessel and the right ventricle, or between the aorta and the pulmonary artery.* The latter is much more common than either of the other varicose aneurisms.

Aneurism of the aorta may be caused by a sudden strain or by injury, but usually the inner coat is first weakened and its elasticity impaired by atheroma. It is more common in men than in women, and in men whose occupations call for occasional sudden and powerful efforts, or require sustained exertion in a cramped position, as miners, colliers, hammer men, sailors, grooms, &c. Mr. Myers, of the Coldstream Guards, has shown that aneurism is unduly common among soldiers in consequence of their ill-adapted clothing and accoutrements. According to the Registrar-General's Returns, there were in the year 1866, in England, the following number of fatal cases of aneurism, viz., $\frac{\text{Males } 325}{\text{Females } 125} - 450$. In males the greater number of deaths occurred between the ages of 25 and 35; in females, between 45 and 50. The average annual mortality from this disease, in both sexes, for the ten years 1857 to 1866 has been 402.

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* For examples of all these forms of varicose aneurism the reader should refer to a paper by Mr. Thurnam in the *Medico-Chirurgical Transactions*, vol. xxiii. p. 323. London, 1840. In the same work (vol. xliv. p. 211. London, 1861), there is an account of a case of Aortic Aneurism, in which a communication with the Pulmonary Artery was recognised during life, by Dr. Willoughby Francis Wade.

The number of deaths from aneurism appears to be steadily increasing, the proportion in 1870 having been 28 to 1,000,000 persons living, as compared with 17 in 1854. How much of this increase is due to improved diagnosis, and how much to an actual increase of the disease from greater exposure to arterial strain in some classes of the population, cannot be determined.

Aortic aneurism is a disease of the middle and somewhat advanced periods of life, rather than of youth. It often results from ossific or calcareous deposits, or from atheromatous or fatty degeneration of the coats of the vessel, or from corrosion of the coats produced by some syphilitic deposit; and consequently other vessels are not uncommonly found affected at the same time. When the tumour is small, its existence frequently goes undetected; the diagnosis under such circumstances, as well as during the early stages, being obscure. Death generally results from hæmorrhage owing to rupture of the sac; but it can also occur suddenly without any rupture, as from suffocation; or it will take place gradually from exhaustion caused by the long-continued suffering; or it may be due to debility brought about by the repeated escape of small quantities of blood; or it may happen from coexistent tubercular consumption.

1. ANEURISM OF THORACIC AORTA.

This disease is chiefly met with in the ascending portion, or in the transverse part of the arch of the vessel.

The symptoms and physical signs of thoracic aneurism will vary according to the part of the aorta affected and with the stage of the affection, and the diagnosis will be extremely difficult or unmistakably obvious in different cases and in different stages of the same case. The symptoms will arise on the one hand from disturbance of the circulation, and on the other from pressure on neighbouring organs and parts. Of these the various pressure effects are the most important. Among them are displacement of the heart downwards, pressure on the root of the right lung, on the vena cava superior, or right innominate vein, on the recurrent laryngeal nerve, on the sympathetic nerve, on the trachea and œsophagus, on the left innominate vein, on the root of the left lung, according as the aneurism springs from the ascending aorta, the arch, or the descending aorta. Again the aneurism may corrode and penetrate the thoracic parietes or the vertebræ, giving rise to pain from pressure on the nerves, or may burst into the pericardium or one or other pleura, or into the trachea or œsophagus, or even into the spinal canal.

It is curious that occasionally aneurismal patients expectorate blood, to the extent of several ounces, for weeks or months before death. Dr. Gairdner has recorded a case in which the first gush of blood took place four years and eight months before the patient's death; blood being also expectorated in varying quantities at different times during this period.* I have already mentioned the case of Mr. Liston, in which five months elapsed between the first and only attacks of hæmoptysis when many ounces of arterial blood were brought up, and death.

The effects on the circulation may occasionally resemble those produced by disease of the heart; other and more characteristic effects are modifications of the pulse appreciable by the finger or shown by the sphygmograph.

The physical signs when present will be some or other of the following:—a pulsating tumour, dulness on percussion, impulse, thrill, murmur, or other sounds audible over the sac.

Aneurism of one of the sinuses of Valsalva at the root of the aorta may cause no symptoms till it proves fatal by bursting into the pericardium. Occasionally it gives rise to angina pectoris, and sometimes to a murmur or thrill.

Aneurism of the ascending aorta when saccular usually projects towards the right, as this side of the vessel is subjected to the greatest distending force. Dulness to the right of the upper part of the sternum, pulsation in this situation perceptible at first perhaps only on a deep expiration, accompanied or not by murmur, but generally attended with the diastolic shock characteristic of aneurism, are the physical signs to which it may give rise. The structures liable to be affected by pressure are the inferior vena cava, giving rise to obstruction to the return of venous blood from the head and upper extremities, the root of the right lung, and perhaps the phrenic nerve, while the heart may be displaced downwards. The pressure effects mentioned are not often present however, as the aneurism usually makes its way forwards, and it may project as a pulsating tumour. When the aneurism is sufficiently high in the vessel to involve the root of the innominate artery, the pulse in the right wrist and carotid may be enfeebled and altered in character or even extinguished.

General tubular dilatation of the ascending aorta is not uncommon. The existence of this condition may be recognised by dulness outside the right edge of the sternum, an abnormal amount of impulse, and especially by the loud sonorous character of the second sound, which is also audible over a larger area than usual. Sometimes in these cases the mouth of the aorta is so much stretched, that the valves, though not diseased, are incompetent to close it, and a diastolic regurgitant murmur is heard.

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* *Clinical Medicine: Observations recorded at the Bed-side, with Commentaries*, p. 509. Edinburgh, 1862.

Aneurism of the arch of the aorta may give rise to different effects according as it springs from the convexity or concavity, or one or other aspect of the vessel. An aneurism of considerable size may be lodged among the parts in the mediastinum, so as to yield only obscure physical signs, such as dulness, impulse, murmur, shock, or thrill. On the other hand, the symptoms may be varied; pressure on the vena cava or left innominate vein, obstructing the return of blood; pressure on the left recurrent laryngeal nerve, producing a cracked state of voice and spasm of the larynx; on the sympathetic, causing contraction of the pupil; on the trachea, giving rise to dyspnœa; or on the œsophagus, giving rise to dysphagia. When the origin of the left carotid or subclavian is involved, the pulsation in the branches of these vessels may be modified.

Aneurism of the descending aorta is still more difficult of detection through physical signs, and frequently its existence is unsuspected up to the moment of its rupture into the pleural cavity. A frequent effect is erosion of the vertebra and pressure on the nerves as they issue from the intervertebral foramina, attended with acute lancinating pain shooting round the side. Occasionally the root of the left lung is compressed, or there may be pressure on the œsophagus, and eventually ulceration into this canal.

In some cases of aortic aneurism there is destructive inflammation of the lung, attended with violent cough, dyspnœa, pain, and perhaps hæmoptysis; the inflammation and gangrene being due either to compression of the pulmonary vessels cutting off the supply of blood, or perhaps to pressure on the pneumogastric nerve diminishing the nervous force, and consequently interrupting the nutrition of the affected lung.

2. ANEURISM OF ABDOMINAL AORTA.

Abdominal aneurism often gives rise to acute pain in the back, and whenever in an adult, especially if the occupation have been such as to require sudden and powerful efforts, there is severe and persistent pain here, not explained by lumbago or other obvious cause, the possibility of aneurism should be borne in mind. There may also be pain shooting into either hypochondrium, and extending downwards into the thighs and scrotum. Constipation aggravates the pain, while lying on the face often affords remarkable relief. By careful examination a tumour may generally be felt, which communicates a constant and powerful pulsation to the hand, and on applying the stethoscope a short, loud, abrupt bellows sound will be heard, but sometimes, and especially when the aneurism is situated between the pillars of the diaphragm, it may remain deep seated and ill defined, so as to be recognised with extreme difficulty. An aneurism here has been known to displace the liver forwards and downwards, and to point below the false ribs in the back.

In the *diagnosis* of aneurism it is necessary to remember that simple or malignant tumours having their seat over the healthy artery, receive pulsation from it. Moreover, if such growths cause much pressure upon the aorta they may produce a murmur. Our diagnosis must be made by a consideration of the history; by noticing that aneurisms pulsate from the first, while tumours only appear to do so when they acquire some size; by remembering that tumours are hard and firm from the commencement, whereas aneurisms only become so subsequently; and by observing that gentle continued pressure will often diminish the size of an aneurism.

The *treatment* of aortic aneurism—whether thoracic or abdominal—must consist in recommending the avoidance of all bodily and mental excitement; in giving relief to the pain, cough, dyspnœa, and other prominent symptoms; in allowing the use of a generous reparative diet, with a little wine or brandy and water, but forbidding malt liquors of every kind; and in paying attention to the digestive, secreting, and excreting functions. By absolute rest and a regulated diet, the amount of fluid being limited and the food being taken in small quantities at intervals of 3 or 4 hours, so as to avoid distending the vascular system by the digested products of a full meal, a cure is sometimes obtained, the sac becoming filled with layers of fibrin and a solid tumour resulting which ceases to increase in size.

The method of cure proposed by Valsalva and Albertini, and which has been since often adopted up to the present time, involves the bleeding of the patient frequently, and the keeping him upon the lowest possible diet compatible with the sustenance of life. By this means it was thought that the force and velocity of the blood would be diminished, and that coagulation would take place in the aneurism. Since, however, the coagulation of fibrin seems to be impeded by diminishing its quantity, and as the rapidity of the heart's action and the throbbing of the arteries are increased by depletion, Valsalva's method would seem to produce effects the very opposite to those wished for; and such is the fact. Dr. Copland says he has seen cases "in which aneurismal tumours had existed for some time without any increase, so long as the patient avoided any marked vascular excitement and continued his accustomed diet; but when repeated depletions and vegetable or low diet were adopted, great augmentation of the tumour, and fatal results followed."

In advanced and aggravated cases we can only endeavour to palliate the various symptoms as they arise. Thus the pain and depression will always be moderated by opium, which may often be advantageously used in the form of subcutaneous injections; the harassing cough may generally be relieved by sedatives and expectorants; the paroxysmal attacks of laryngeal dyspnœa, when threatening the extinction of life, might be removed by the careful performance of tracheotomy; the dropsy can be often lessened by mercury, digitalis, squills, juniper, juice of broom, and other diuretics; while the heart's action may be regulated and moderated by assafœtida, camphor, digitalis in small doses, and particularly by aconite. With all cases, experience no less than common sense teaches us to avoid too debilitating a plan of treatment. This is especially proved by the fact, that of all the causes of aneurism a degeneration of the arterial coats is the most common. Nevertheless, where there is considerable pulmonary congestion, or when the pressure of the aneurism is giving rise to very severe suffering, a small venesection may often afford relief; the lowering effects of the loss of blood being compensated for by a liberal diet.

Since the fourth edition of this work was published in 1861, various special methods of treating aneurismal tumours have been proposed:—(1) The first plan consists in the introduction of a quantity of fine iron wire into the aneurism, with the object of affording an extensive surface upon which fibrin may coagulate. This practice was adopted by Dr. Murchison and Mr. Charles H. Moore in a case of saccular aneurism of the ascending aorta projecting through the anterior wall of the left side of the chest; upwards of twenty-six yards of wire being passed through a small pointed cannula inserted into the tumour. The treatment was unsuccessful, but it was not adopted until it was clear that the patient could not live many days.

(2) Another plan is by galvano-puncture. A long needle insulated to within an inch of its point by a thin coat of shellac and gutta percha is pushed into the aneurism, and is connected with the negative pole of a battery of from four to eight cells; the positive pole formed by a plate of zinc resting on a piece of lint moistened with salt and water is applied to the skin near the tumour, and a galvanic current is passed through the sac. Coagulation of blood takes place round the needle, and more or less consolidation is obtained. Up to the present the failures by this method have been more numerous than the successes, but it has usually been applied in desperate cases.

(3) It has been proposed to tie the left carotid artery in aneurism of the arch of the aorta, this proceeding being suggested by the occurrence of spontaneous cure when this vessel has been blocked up by a clot.

(4) Dr. William Murray, of Newcastle-on-Tyne, has had the satisfaction of curing a case of aneurism of the abdominal aorta,

and of setting an example which has been followed with success by many others, by compression of this vessel immediately above the tumour. The first attempt failed; but on the 19th April, 1864, the patient (a man twenty-six years of age) was kept under the influence of chloroform for five hours, during which time pressure was maintained by a properly constructed tourniquet. It was only, however, during the last hour that pulsation in the tumour could be found to have almost ceased on the removal of the instrument; the tumour having become quite pulseless by the evening. Three months afterwards the man was at work as an engine-fitter; the tumour being scarcely appreciable, while the aorta and iliacs and femoral arteries were quite pulseless. This case proves that the aorta has been occluded without either temporary or permanent serious disorder, and that there must be a collateral system of vessels so complete as to carry on the circulation when the aorta is blocked.* Dr. Murray believes that in the *rapid pressure treatment of aneurism* the cure takes place by the coagulation of the blood in the sac, and not by the deposition of fibrin. To prevent any mishap or failure the patient must be thoroughly under the influence of some anæsthetic, so as to permit the application of a powerful pressing instrument on sensitive parts, as well as to restrain all muscular action; for success depends upon the complete arrest of all movement of the blood in the aneurismal sac, with retention of this fluid in a motionless state, just as happens from the application of a ligature to the artery above the seat of disease. Great care is also required in the choice of the position at which the tourniquet is to be applied, and to avoid undue compression and bruising of the abdominal viscera. Dr. O'Ferrall has advised the use of distal as well as proximal pressure, a suggestion which has been successfully carried out by Dr. Mapother. Distal pressure, however, is seldom needed in the treatment of aneurisms requiring pressure on the abdominal aorta; since, as Dr. Murray remarks, the collateral circulation to the lower parts of the body is here so limited as to render a current into the distal orifice of the aneurism improbable. As regards the duration of the treatment we are not in a position to lay down any rule. It must depend on the cessation of all pulsation in the tumour. In an example of aneurism of the abdominal aorta treated by Dr. Heath, at Sunderland, consolidation occurred within twenty minutes of the second attempt; the first trial, with irregular pressure for ten hours, having failed.

(5) Dr. William Roberts, of Manchester, has recorded a case of aneurism of the arch of the aorta making its way through the parietes of the chest, which was treated by iodide of potassium in

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* *Medico-Chirurgical Transactions*, vol. xlvii. p. 187. London, 1864. A further report of the case, showing that the cure was complete. is to be found in the *Medical Times and Gazette*, p. 383, 15 April, 1865 See also the *British Medical Journal*, p. 287. London, 5 October, 1867.

doses of five, seven, ten, fifteen, and twenty grains three times a day, and with apparently most marked benefit. Several other cases are mentioned, in which similar results were manifested. Nélaton, Bouillaud, Andral, and Beau have recorded corroborative experiences, and from these Dr. Roberts collects and gives an account of twelve cases. In all of them, save one, striking relief of suffering followed the use of the drug; in eight, an undoubted diminution in the size of the sac took place; and in a few, complete subsidence of the swelling seems to have occurred. The cases of Dr. Chuckerbutty would appear to indicate that the beneficial effect of the iodide was owing to its power (hitherto wholly unsuspected) of increasing the coagulability of the blood. Dr. Wilkinson's case lends support to this view; for not only was the sac lined with layers of fibrin, but a very firm and decolorized fibrinous mass, attached on one side, floated in the cavity of the aneurism.*

XVIII. DISEASES OF THE PULMONARY ARTERY.

Although the diseases which affect the pulmonary artery are important, yet they have scarcely attracted as much attention as they merit. This is in some measure owing to their comparative rarity, and partly to the obscurity which clouds their diagnosis.

Examples of *inflammation* of the coats of this vessel have occasionally been met with. The reports of many of these are, however, but of little value; since the cases occurred when our knowledge of the spontaneous coagulation of the blood during life was very imperfect, and when the presence of a fibrinous deposit in an artery (thrombosis) was regarded as a consequence of inflammation. In the very excellent work of Dr. Norman Chevers† it is stated that acute inflammation of the pulmonary artery is found to occur under the following circumstances:—(1) As a sequence of phlebitis. (2) In cases of Bright's disease, and in persons habitually intemperate. (3) As a result of exposure to cold, and from rheumatism. And (4) as an accompaniment of certain forms of pneumonia. The chief sign which Dr. Chevers seems to rely upon as showing that inflammation has been present is the occurrence of *adherent* clots in the vessel; but it has been argued by Sir James Paget and others that diseased blood (such as that contaminated with urea) has a greater tendency to adhere to the walls of the vessels than blood which is healthy.

Morbid growths are very seldom found in the pulmonary artery. Dr. Chevers quotes the history of an illustrative case which occurred in the practice of Dr. Edmund L. Birkett. The patient was a poor woman, 25 years of age, "inhabiting an ill-ventilated room in a badly-drained part of Bermondsey," who had been frequently subjected to exposure to cold, and who in consequence had suffered from several attacks of thoracic inflammation. When visited, fourteen days after the commencement of her illness, her aspect was anxious and distressed; there was great dyspnœa, almost amounting to orthopnœa; she had a slight cough, without any expectoration; and the pulse was feeble, quick, sharp, and vibrating. She complained much of pain about the præcordial region, and of palpitation. The heart's action was tumultuous, its rhythm normal, and its impulse stronger than natural. Death took place about six weeks after Dr. Birkett first saw her. At the autopsy there were found,—extensive old pleuritic adhesions, with congestion of the lungs; a smooth pericardium, white and opaque at parts; a large heart, with its nutrient vessels much gorged; while "within the pulmonary artery, at its point of division, was a circular space as large as a fourpenny-piece, surrounded by a ring of vegetations, to which was slenderly attached a mass of the size of a large walnut, of a yellowish colour, and in substance resembling the roe of a mackerel."

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* *British Medical Journal*, p. 83. London, 24 January, 1863.

† *Collection of Facts illustrative of the Morbid Conditions of the Pulmonary Artery*, p. 82. London, 1851.

The canal of the pulmonary artery may become *contracted* or *obstructed*. These conditions are generally due to the formation of a fibrinous clot; or they can arise gradually owing to the pressure of a cancerous or innocent tumour, or to that exerted by an aortic aneurism, or to that produced by extensive thoracic effusion in double pleurisy. Dr. Barlow has especially directed attention to the cases of young patients, who from birth have suffered from an ill-developed condition of the respiratory apparatus, in connexion with congenital narrowing of the pulmonary artery. In all such cases, either constant or only paroxysmal, dyspnœa is a prominent symptom. Dr. Chevers was the first to point out the distinctive circumstance that, in a large proportion of cases, individuals suffering from great narrowing of the pulmonary artery, select the recumbent position, either habitually or during the paroxysms of difficult breathing; while the subjects of any other form of obstruction to the circulation through the lungs, or through the left heart, breathe most freely when the shoulders are raised and the body is placed almost vertically. The reason why the horizontal posture is the easiest in narrowing of the pulmonary artery is, that the distress of breathing results from the insufficient access of blood to the lungs; and hence the recumbent position not only affords the aid of gravitation to the contractile efforts of the heart, but also renders the supply of arterial blood to the brain more free than it could otherwise be. The other symptoms of some impediment to the passage of blood through the pulmonary artery are,—a superficial systolic murmur, which is heard in the course of the vessel, and over the base of the right ventricle; an habitually small, rapid, regular pulse, usually with excessive action of the heart; together with a livid hue of the surface, where the obstruction is considerable.

The remaining morbid conditions of this vessel are,—*dilatation* which generally follows hypertrophy of the right ventricle, the consequence of long-standing vesicular emphysema; *ulceration,* owing generally to the pressure exerted by an aneurismal tumour of the arch of the aorta; and *rupture,* either as the result of mechanical injury, or of a degeneration of the coats of the vessel. The occurrence of *aneurism* in this vessel has been rarely observed. According to Dr. Chevers, the great dilatability of the ascending portion of the artery appears to be the principal cause of its immunity from this lesion; while its internal branches are still further protected by the elastic support afforded by the lung tissue. Sometimes, doubtless, an aneurism has been present, but it has been overlooked, and many cases are on record in which an aneurism has formed in cases of tubercular phthisis, the rupture of the sac producing fatal hæmoptysis.

PART VI.

DISEASES OF THE THORACIC WALLS.

I. PLEURODYNIA.

Pleurodynia [from Πλευρὰ = the side + ὀδύνη = pain], or chronic rheumatism of the walls of the chest, is a disorder of almost every-day occurrence. It is of importance on account of the long-continued pain to which it often gives rise; and partly because it is always believed by the patient to be an inflammation of the side, while every now and then it is mistaken by the practitioner for pleurisy or pericarditis, or even for peritonitis.

This affection is sometimes associated with rheumatism of the joints, but in by far the greater number of cases there is no such combination. In nineteen cases out of twenty, the muscular and fibrous textures of the left side of the chest are alone affected. The pain may be acute, and it often comes on suddenly; being referred to the infra-mammary region (though sometimes it extends rather lower), and being increased by a deep inspiration or by any stretching movement of the trunk.

The *diagnosis* is easy with moderate care; for although there is aften tenderness on pressure, with slightly impaired thoracic movement, yet there are none of the physical signs of pleurisy, &c. The pulse also does not betoken inflammation; while the tongue is clean, the skin inclined to be cool rather than unduly hot, and there is no real dyspnœa. Out of the large number of cases which I have seen, I can recollect none where the general symptoms have not been those of impaired health, with debility; there usually being found, moreover, more or less constipation, loss of appetite, mental depression, and the secretion of urine containing an excess of phosphates or urates. One of the worst examples of pleurodynia which I have met with occurred in a medical man who was suffering from acute rheumatism affecting the knees and ankles; and I well remember the incredulity with which he received my opinion that his pericardium was healthy, as well as the difficulty that was experienced in preventing him from taking calomel and having a vein opened. The success which followed the use of simple treatment, however, quite reassured him.—In tertiary syphilis there is often pain about the middle of the sternum, and sometimes costal periostitis; but a consideration of the general symptoms, together with a local examination, will prevent this disease from being mistaken for pleurodynia.—In herpes zoster or the shingles, sharp pain often precedes the appearance of the vesicles; but the suffering is usually of a burning character, and is not increased by movement.

Pleurodynia affects men rather more frequently than women, probably because of the greater exposure of the former to the sources of rheumatism. The residents of marshy districts, the inhabitants of damp houses, coal porters and other labouring men who drink large quantities of beer, as well as policemen or soldiers on night duty, are very liable to this affection.

In the *treatment* of these cases, over-active remedies ought decidedly to be avoided. Cupping, leeching, severe purging or sweating, and blistering will only render the disorder more intractable. If the pain come on in the course of rheumatic fever, it may merely be necessary to order fomentations or hot poultices in addition to the remedies which are being employed. But in ordinary cases, where the pleurodynia is the sole manifestation of any disease, a cure may generally be effected in from three or four days to a fortnight, by a mixture of ammonia, tincture of aconite, and bark (F. 371); by one or two warm water or Turkish baths (F. 130); by friction night and morning with a belladonna and opium liniment (F. 281); and by plain nourishing food. Stimulants can be given, if necessary; but all kinds of beer and port wine should generally be avoided. In obstinate cases, iodide of potassium (F. 31) may be required; while cod liver oil will often prove extremely useful.

II. INTERCOSTAL NEURALGIA.

Neuralgia [from Νεῦρον = a nerve + ἄλγος = pain] may affect the intercostal, as it does the other nerves of the body. The pain is either of a dull and continued aching character, or it comes on in sharp paroxysms; while it is most frequently situated in the sixth, seventh, eighth, or ninth nerves of the left side. These nervous trunks (anterior primary branches of the dorsal nerves) pass forwards in the intercostal spaces with the vessels, and are distributed to the parietes of the thorax and abdomen. The pains, whether dull or severe, follow the course of the nerves, and extend from the thoracic wall directly backwards to the vertebræ. One or two particularly painful spots can often be detected by pressure, while sometimes there is cutaneous hyperæsthesia of the whole mammary or infra-mammary region. There are no febrile symptoms; the pleuræ, lungs, and heart are found healthy; but there are often indications of debility. The catamenia are sometimes irregular, or the flow may be supplemented by an abundant leucorrhœal discharge. Oftentimes there is some uterine or ovarian disorder present; particularly such as retroflexion, excoriation of the labia, or chronic ovaritis.

Chlorotic and hysterical women suffer most frequently from this species of neuralgia. I have met with it during the progress of Bright's disease. It may form a subsidiary phenomenon in phthisis. The pain sometimes lasts for weeks; being got rid of with the greatest difficulty in those cases where there is no obvious condition of the general health, or no local affection, to account for it. Intercostal neuritis is the only disease with which it can be really confounded, and this is of very rare occurrence. A dull tensive aching, referred to the left hypochondrium, is not unfrequently complained of in affections of the spleen; but the pain is seldom troublesome until the gland has become so much enlarged that it can be readily felt.

The remedies which are usually the most beneficial, consist of quinine, iron, cinchona, cod liver oil, and a nutritious diet. Friction with liniments containing belladonna and aconite gives relief. Sometimes, pressure by means of strips of belladonna plaster applied all round the thorax is a source of great comfort. Where there are one or more obstinately tender points, the subcutaneous injection of the sixth of a grain of morphia (F. 314) will effect a cure, if employed in conjunction with remedies that improve the general health.

III. THORACIC MYALGIA.

The tendinous insertions of the fleshy bodies of the pectoral muscles, and sometimes of the intercostal muscles, every now and then become the seats of a hot wearying pain, which is often mistaken for pleurodynia and even for more serious diseases. It is probable also that the diaphragm, like the other muscles of respiration, occasionally suffers from myalgia; especially where the ceaseless action of this septum gets exaggerated by affections attended with dyspnœa.

Myalgia [Μῦς = muscle + ἄλγος = pain] is generally due to over-work of the affected muscles. It is a disorder common to both sexes, though probably arising most frequently in males. The pain is seldom complained of in the morning, especially after a good night's rest; but it follows upon a few hours' exertion, and gradually increases towards the evening. Patients give various accounts of the amount of suffering, and frequently the descriptions appear to be exaggerated. No doubt some individuals feel pain much more acutely than others; so that what is regarded as almost torture by one would be looked upon as trifling by another. The physical suffering, however, is not on these grounds to be lightly thought of; and especially should the practitioner avoid the habit easily acquired, of looking upon a reputed pain as imaginary, because it is spoken of in more extravagant terms than he may think warrantable.

In all cases of persistent myalgia the blood is more or less impoverished, and consequently the general health will be found depressed. Sometimes the appetite is bad, and the digestion impaired; the bowels are constipated; attacks of palpitation are common; the sexual functions are disordered; and there is a disinclination for work of any kind. The patient also is irritable or low-spirited. From this it follows that the treatment should consist in diminishing for a time those exertions or movements which have been the partial cause of the disorder; while a certain amount of rest is to be especially ensured to the affected muscles by the application of a flannel bandage round the thorax. Friction with anodyne liniments will also be of service; but above all the general health ought to be improved by remedies to promote digestion, quinine with ferruginous tonics, and nourishing food. The use of strips of opium or belladonna plaster around the painful part of the chest often does good; the favourable result being partly due to the support afforded to the muscles, and partly to the soothing of their excessive irritability.

IV. ABNORMAL CONDITIONS OF THE DIAPHRAGM.

Considering the very important parts with which the diaphragm is in relation, it cannot appear surprising that this thin musculo-fibrous septum often gets involved in the diseases of adjoining organs and tissues. Independently of its position as a barrier between the thorax and abdomen, the diaphragm is the most important inspiratory muscle. Then its upper or thoracic surface is in relation with three serous membranes—the pleura on either side, and the pericardium covering the tendinous centre; while its under or abdominal surface is closely connected with the peritoneum. Moreover, through three large openings in its coats are transmitted the aorta and thoracic duct and right azygos vein, the œsophagus and pneumogastric nerves, and the inferior vena cava. Being thus placed in such close approximation with the pleuræ, lungs, and heart by its upper convex surface, it cannot but often become involved when morbid action is set up in these vital organs. So the connexion of its under concave surface with the liver, the spleen, and the left or greater extremity of the stomach; and less intimately with the kidneys, pancreas, transverse portion of the duodenum, and solar plexus must materially tend not only to influence its action, but also to make it a frequent secondary seat of disease.

Inflammation of the diaphragm, or diaphragmitis [Διάφραγμα = a separation between two parts, from διαφράγνυμι, with the terminal *-itis*], is probably only met with by the physician when it sets in consecutively to disease in adjoining organs. The morbid action may possibly, however, have its starting point in a rheumatic state of the system; none of the thoracic or abdominal viscera being at the same time affected. As a consequence of punctured wounds, fractured ribs, and other mechanical injuries, diaphragmitis is every now and then observed in hospital practice.

The chief symptoms of this disease are those presented in other important inflammations; supplemented by the occurrence of severe tenderness with a sense of constriction around the upper part of the abdomen and back, great pain about the sternum and lower ribs on coughing or sneezing or making a deep inspiration, more or less dyspnœa, the performance of the respiratory movements almost wholly by the intercostal muscles, painful deglutition, anxiety of countenance, frequent hiccup and sobbing, spasms or cramps of all the abdominal muscles, and perhaps a sense of suffocation with delirium. Where, in fatal cases, an opportunity has been afforded of ascertaining the effects of the inflammatory action, the results which have for the most part been observed have consisted of effusions of coagulable lymph or of a sero-albuminous fluid, or of patches of ulceration, or of small collections of pus. When recovery has happened and examinations have been made after the lapse of years, the diaphragm has been seen to have become abnormally adherent to neighbouring viscera; while it has also perhaps been found considerably thickened, with its tissue rendered almost as dense as cartilage.

The treatment should be of the same character as that required in inflammations of the organs connected with this muscle. Belts of linseed poultice, made very hot and moist, and medicated with the extracts of belladonna and poppies (F. 297) are especially serviceable. Vomiting is to be allayed by the use of ice. The inhalation of chloroform and ether (F. 313) will often relieve the hiccup when all other remedies fail. The persistence of pain at any one point can be stopped by the use of the ether spray, or by subcutaneous injections of morphia and atropine (F. 314). The importance of milk as an article of nourishment is not to be overlooked.

Fatty degeneration of the diaphragm is a morbid state which is probably more common than at first sight the practitioner will feel inclined to believe. The affection, however, has been overlooked; and chiefly for the reason that in a large number of post mortem examinations the condition of this septum still escapes investigation. So far as I can call to mind, Mr. G. W. Callender has been the first to notice this disease.* Here and there cases have been reported where the diaphragm has been discovered wasted in connexion with a similar affection of the other muscles of the body. But in the widely different instances published by Mr. Callender, the tissue of the diaphragm has been found to have undergone conversion into fat; the granules of which have destroyed and taken the place of the muscular fibres. For the most part, this degeneration has been met with in connexion with a similar change in the muscular structure of the heart; so that sometimes death has occurred from a failure of the action of this organ, sometimes from severe disturbance and embarrassment of the breathing owing to the inability of the spoiled and fatty diaphragm to contract properly and to allow of normal inspiration. Now and then not only the structure of the heart and diaphragm is more or less destroyed by fatty degeneration, but other muscles, with the liver, and coats of the bloodvessels, are injured in a similar way. In such, death may of course happen in one of several ways,—from exhaustion, from syncope, from rupture of the heart, from cerebral hæmorrhage owing to the coats of a vessel giving way, or from the breathing becoming laboured to a degree incompatible with life. The question as to which organ shall first give way, will probably be determined by accident; that which becomes over-strained or excited being the one to yield.

Cancer of the diaphragm as a primary disease is unknown. Cancerous infiltration or deposit, the consequence of the extension of malignant disease from the liver or œsophagus or other adjoining organs, is not very uncommon. Under these circumstances, one or more large masses of cancer will perhaps be found, on the under or upper surface of the diaphragm; or there may be merely a number of papulæ, with small patches or laminæ formed by the coalescence of several of these pimples. Moreover, isolated cancers have been observed in this structure; that is to say, cancer of the diaphragm may be the only disease detected at the necroscopy, the original mischief having been removed some time previously by operation. This appears to have been so in a case related by Sir Robert Carswell; in which several nodules varying in diameter from a pea to half-a-crown, and formed of a scirrhous stroma with a milky-looking infiltration, were discovered in the diaphragm of a woman who had previously had her breast amputated.

Syphilitic gummous tumours have been found in the diaphragm; these growths ofttimes extending upwards into the lung, in other instances downwards into the liver. Now and then, both the lung and liver are firmly adherent to the gummous mass. In a woman who died at the Middlesex Hospital, in November, 1861, of syphilitic disease of the dura mater and liver, there was found a firm and pale-yellow tumour with white septa running through it, the size of half a large orange, embedded in the substance of the diaphragm. The growth projected downwards, and was inseparably connected with the left lobe of the liver, as well as with the spleen. I know of no means by which such a morbid condition could be detected during life.

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* *The Lancet*, p. 39. London, 12 January, 1867.

Laceration or perforation of the diaphragm has occurred from falls and other accidents; from attempts to suppress the pains of parturition; and from violent vomiting. It has also taken place in consequence of the extension of suppuration and ulceration from the liver, spleen, or even stomach; from the rupture of an aortic aneurism which had encroached on its texture; from malignant degeneration; from the extension of hydatid cysts upwards from the liver, or downwards from the lungs; as well as from some congenital malformation or cleft becoming unusually strained and so giving way at its border. When the diaphragm is ruptured, there is usually hernia of abdominal viscera into the chest.

Paralysis of the diaphragm is a rare occurrence, but it is sometimes left after an attack of pneumonia, or pleuro-pneumonia, or it may have no obvious cause. Injury to both phrenic nerves or their implication in a tumour may give rise to it. The symptoms are extreme frequency of respiration and disproportionate movements of the ribs to compensate for the deficient expansion of the lungs. The characteristic feature, however, is the flapping to and fro of the abdomen, which is drawn in during inspiration and forced out in expiration, following of course the movements of the diaphragm, which instead of contracting and descending during inspiration is carried upwards by atmospheric pressure. Another effect is great feebleness of the voice in consequence of the impossibility of giving adequate tension to the air in the chest.

Finally, *convulsive action of the diaphragm*, or spasms of the midriff, may prove troublesome as a mild idiopathic affection, or as a consequence of irritation from morbid action going on in adjoining tissues, or as a result of general exhaustion from disease in distant organs. Hiccup is a curious effect of the sudden and involuntary and momentary contraction of the diaphragm, the glottis being simultaneously narrowed. In vomiting, crying, sobbing, sneezing, &c., there is convulsive action of the midriff; the other muscles of respiration being likewise affected. Moreover, in weakly subjects long-continued attacks of hiccup or vomiting, of chronic cough, of dyspnœa, &c., may lead to diaphragmatic myalgia; a painful affection which has been referred to in a preceding section.

PART VII.

DISEASES OF BLOOD-VESSELS AND LYMPHATICS.

I. ARTERITIS.

Arteritis, or inflammation of the arteries, is very rare in an acute form, except as a result of injury or surgical operation, such as ligature or division in amputation, when it is local and reparative. Occasionally, however, in unhealthy conditions of system a diffuse arteritis occurs giving rise to acute burning pain in the parts supplied, with tenderness along the course of the vessel, and ultimately gangrene may result, though this is extremely rare.

Chronic arteritis is much more common, especially in the larger vessels, since atheroma (*endarteritis deformans*), formerly considered to be purely degenerative, is now known to be inflammatory. One of the chief causes is overstrain upon the vessels, either from the habits and occupation of the individual, or from resistance to the passage of the blood through the capillaries and minute arteries as in Bright's disease, gout, &c. Exudation takes place in the inner coat in patches, giving rise to smooth elevations on the interior of the vessel of an opaque yellowish-white appearance. Subsequently degeneration of the effused matter takes place, and it may liquefy and burst through into the vessel, or may become cretified. These changes do not give rise to marked symptoms, but the impairment of elasticity induced when the condition is extensive may sometimes be recognised by the sphygmograph.

II. PHLEBITIS.

Phlebitis [from Φλὲψ, φλεβὸς = a vein; terminal *-itis*], or inflammation of the veins, depends upon, or is generally accompanied by, disease of the blood. Mr. Henry Lee has distinctly shown that the lining membrane of veins has a very slight tendency to inflammation; that the morbid action is much less mischievous than it used to be considered, unless it be accompanied by the admixture of decomposing fluids with the blood; and that the internal coat when inflamed does not exude lymph as a serous membrane does. Indeed it is now well known, from recent experiment and observation, that the doctrines of the effusion of lymph from the lining membrane of veins, and the formation of pus by the same, are quite untenable. As Virchow has proved, the history of the affections of veins to which the term phlebitis has been hitherto applied, is really the history of the coagula (thrombi) formed within them, and of the metamorphoses through which these coagula pass.

The *symptoms* of phlebitis are,—pain which is increased on pressure, swelling, stiffness, and redness in the course of the vessel generally spreading upwards towards the heart. When suppuration results, it is usually accompanied, or perhaps preceded, by rigors and flying pains in various parts of the body. The constitutional disturbance is always great. The result of the admixture of pus or other morbid fluid with blood is to cause the latter to coagulate: in this way a vein sometimes becomes filled with a coagulum; when, if the morbid matter is of such a nature that it ought to be eliminated, the connective tissue around inflames, suppuration and abscess follow, the coats of the vein ulcerate, and the contained clot is discharged by means of the abscess. On the other hand, where the poison does not produce coagulation it mixes with the circulating blood, affects the whole system, and is subsequently deposited in distant parts—as in the lungs, liver, spleen, eye, joints, areolar tissue, &c. Under these circumstances, the consequences are always very serious.

The *treatment* consists in employing rest, fomentations and poultices, and purgatives. When the system is low, stimulants and tonics will be necessary; especially good beef-tea, port wine or brandy, ammonia and bark, and opiates to relieve the restlessness.

Phlebolites [from Φλὲψ = a vein + λίθος = a stone] are occasionally met with in the veins; and as they generally lie in dilatations, they do not obstruct the flow of blood. These bodies vary in size from that of a millet seed to that of a pea. There may be only one or two calculi, or a dozen or more. They are chiefly composed of phosphate of lime, carbonate of lime, and animal matter. Phlebolites are probably formed by calcareous deposits from the blood, thrown around a small coagulum; as hepatic calculi are produced by depositions from the bile upon fragments of cholesterine.

One or more of the large veins have been found compressed by *syphilitic gummous substance* deposited around the coats. In such cases, other evidence of the cause of the disease, confirmatory of the diagnosis of syphiloma, has been present. The amount of venous distension and swelling beyond the seat of pressure will of course depend on the extent to which the passage of blood through the affected vessel is obstructed. Unless the complications are of such a nature as to preclude all hope of recovery, treatment by large doses of iodide of potassium and bark, or by chlorate of potash and steel, should be adopted.

III. AIR IN THE VEINS.

The very great danger which results from the entrance of an appreciable quantity of air into a vein during a surgical operation has long been recognised. The important bearings of this subject, however, on the practice of obstetrics, as well as on the treatment of uterine diseases, have been less appreciated; though they are deserving of very serious attention.

The characteristic symptoms of the occurrence of this accident during an operation upon the breast, neck, shoulder, or axilla are the following:—Suddenly, while all seems going on well, a hissing, or gurgling, or bubbling sucking noise is heard; the countenance becomes pallid or livid, and sometimes intensely red at a later period; the pulse gets nearly or quite imperceptible, and the respiration laboured; while perhaps there sets in violent and irregular action of the heart. The patient when not under the influence of an anæsthetic, complains of extreme faintness and oppression of the chest, or perhaps has merely time to exclaim "I am dying;" and death often follows very quickly, perhaps with a convulsion, but frequently without a struggle. In the greater number of fatal cases, the autopsy has revealed the presence of air in the right cavities of the heart, the air being free, or mingled with the blood which is thus rendered frothy; while sometimes bubbles of air have also been found in the larger veins, as well as in the branches of the pulmonary vessels. The cause of death is the mechanical interference of the air with the action of the heart, and the difficulty of forcing frothy blood through pulmonary capillaries; severe syncope ensuing, owing to the deficient supply of blood to the brain. The warning symptom is the hissing noise; and directly it is heard the surgeon should compress the wounded vein, so as to prevent the further ingress of air. The patient ought then to be placed in the recumbent posture; ammonia is to be held to the nose, while brandy is administered by the stomach or rectum; artificial respiration is to be perseveringly and steadily employed; while the extremities may be rubbed upwards, so as to force on the circulation towards the brain. In very severe cases, the application of galvanism to the thoracic muscles must be tried. When death has happened, the quantity of air which has entered the heart has been considerable; the amount having probably been small in those instances where the dangerous symptoms have passed off and recovery has ensued.

When the air enters the circulation through the uterine veins, the symptoms are as well marked as in the surgical cases. Attention seems to have been first directed to this occurrence by Legallois, in 1829; who, while watching a rabbit that had had two successive inversions of the uterus after parturition, noticed that she suddenly struggled convulsively and died in less than three minutes. The right auricle was found full of air bubbles, while air was also discovered in the pulmonary artery, venæ cavæ, &c. This eminent physiologist also observed the same occurrence in two other animals; and Olivier in remarking upon these facts asks,—"Is it to a cause of this kind that we ought to attribute the sudden and unexpected death in women lately delivered, and where the autopsy has disclosed nothing which could account for such a catastrophe?"[*]—In 1844, Professor Simpson saw a patient who had been delivered of twins an hour or two previously. There was hæmorrhage, with alternate contractions and relaxations of the uterus; she had a very weak and rapid and almost imperceptible pulse, with an extremely anxious countenance; while here and there was an evanescent scarlatinoid rash over the surface of the body. A few hours after death, the abdominal contents were exposed under water; the uterine and hypogastric veins and lower vena cava being found full of frothy blood, the air bubbling up through the water when these tubes were opened.[†]—In 1850, Dr. Cormack read a paper on the entrance of air by the uterine veins before the Westminster Medical Society; in which he showed, amongst other points, that the communication between the cavity of the womb and the current of blood in the inferior vena cava is direct and easy, so that air once introduced into the uterine veins must soon be carried to the right auricle; there, if in sufficient quantity, to cause frothing of the blood, aeriform distension of the right side of the heart, obstruction of the pulmonary artery, and congestion of the pulmonary capillaries.[‡]—And then, in 1857, Dr. George May, of Reading, collected the histories of eleven cases, in which death during or soon after labour had been more or less sudden, owing, as he believed, to the entrance of air through the uterine veins. In one of the cases which Dr. May saw himself, the labour had been natural and the patient had resumed her duties; when, on the eighth day after delivery, she was taken suddenly ill and expired. On the following day, frothy blood was seen on slicing the liver, there was air in the inferior vena cava and in the vena portæ, and the right side of the heart was distended with frothy blood.[§]

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[*] *Dictionnaire de Médecine.* Article "Air," p. 73. Paris, 1833.

[†] *Physiological, Anatomical, and Pathological Researches.* By John Reid, M.D., p. 579. Edinburgh, 1848.

[‡] *London Journal of Medicine*, vol. ii. for the year 1850. pp. 589 and 928.

[§] *British Medical Journal*, 6 June, 1857. Also in the *Half-Yearly Abstract of Medical Sciences*, vol. xxvi. p. 232. London, 1858.

Again, not only has the entrance of air through the uterine veins caused death at the time of labour, but it has likewise proved fatal in disease. Thus, Professor Oppolzer has related an instance of uterine carcinoma, in the course of which air entered the circulation spontaneously, and caused death in about twenty-four hours.

The treatment of these cases must be conducted on the same principles as guide the surgeon when air enters a vein during an operation. Unfortunately, however, there is greater difficulty in following out the indications. Thus, to prevent the further ingress of air we can only plug the vagina—an operation which cannot be performed in a few seconds. Still, stimulants may be administered, and artificial respiration had recourse to; while warmth can be applied to the extremities, cold water dashed over the face and chest, and the patient kept absolutely quiet in the recumbent posture.

IV. PHLEGMASIA DOLENS.

Phlegmasia dolens [from Φλέγω = to burn: *doleo* = to be in pain], milk-leg, or white-swelling, may be defined as a brawny, non-œdematous, painful swelling of the extremities, usually the lower, attended with depression of the vital powers. It probably depends upon the spontaneous coagulation of blood in the veins; the coagulation being due to the reception within these vessels of some poisonous or acrimonious fluid, or occasionally to pressure, or merely to a cachectic state of the system. The disease commences for the most part, and especially in puerperal women, in the uterine branches of the hypogastric veins, extending thence to the iliac and femoral veins. It has been termed obstructive phlebitis, by those who contend for its inflammatory origin. It is most likely that the lymphatics are also involved, and that they become obstructed.

Phlegmasia dolens is very common after parturition, especially in women who have been much weakened by flooding, or other causes; while it is rarely met with after first labours. It also occurs not unfrequently towards the termination of uterine cancer, and in the arm in mammary cancer. The left leg is said to be more frequently attacked than the right.

Symptoms.—The disease commences generally, in from one to five weeks after labour, with fever, headache, thirst, nausea, and pain. Sometimes it begins with a chill or rigor. At the end of twenty-four or thirty-six hours, there is swelling, with loss of motor power in one of the lower extremities (both limbs are very seldom affected); the swelling often commencing about the foot or lower part of the leg and extending upwards, though sometimes it begins at the upper part of the thigh and proceeds downwards.

The limb is unnaturally hot, tender, not œdematous, but swollen perhaps to twice its natural size; it is of a pale white colour, and is tense and elastic; while it has also a glazed or shining appearance. The acute stage generally lasts about fourteen or twenty-one days; but the limb frequently remains swollen and feeble, or almost useless, for many weeks or even months.

Prognosis.—This is generally favourable, the disease very rarely proving fatal. As the general health is improved, the swelling and tenderness decrease; although some tumefaction, with diminished power and sensibility of the limb, may continue for a few months. When a woman has once suffered from phlegmasia dolens after parturition, great care should be taken to maintain her health during subsequent pregnancies and labours.

Pathology.—Dr. Mackenzie rejected the opinion that this disease arises from phlebitis. He believed that it is due to a vitiated state of the blood, giving rise to *irritation* of the nerves, muscles, lymphatics, lining membrane of veins, and areolar tissue of the limb; owing to which there result the tense elastic swelling, pain, loss of the power of motion, affection of the lymphatics, and obstructed condition of the veins, constituting the pathognomonic symptoms. Hence, this gentleman asserted that phlegmasia dolens is a blood disease, the affection of the veins being of secondary importance since it is merely an effect of the disorder.* Dr. Robert Lee (in a paper published in the same volume as Dr. Mackenzie's) gives the results of his last twenty-four years' experience. His cases, he says, "prove in the most conclusive manner that inflammation of the iliac and femoral veins is the proximate cause of the disease; and that in puerperal women, the inflammation commences in the uterine branches of the hypogastric veins. It has likewise been demonstrated by morbid anatomy, that phlegmasia dolens is a disease which may take place in women who have never been pregnant, and in the male sex, and that, under all circumstances, the proximate cause is the same."

A later writer on this disease is Dr. Tilbury Fox, whose essay is well deserving of careful study.† I can only give this gentleman's conclusions, which are as follows:—In phlegmasia dolens both veins and lymphatics are obstructed. The obstruction may either be due simply to extrinsic pressure; or to inflammatory changes in the coats of the vessels leading to coagulation (this depends upon virus action), which except during epidemics of puerperal fever is not so common as is supposed. It being generally admitted that rapid ingress of abnormal fluid suddenly, and in large amount, will cause instantaneous coagulation of blood; and it being also allowed that large drains from the system are followed by rapid and compensatory absorption;—there is good reason for believing that these conditions are amply fulfilled, in conjunction with the presence of wound (facilitating absorption) in a great many cases, prior to the occurrence of phlegmasia dolens, and that the latter is frequently thus evolved. These different modes of evolution may be more or less conjoined.

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* *Medico-Chirurgical Transactions*, vol. xxxvi. p. 169. London, 1853.

† *Transactions of the Obstetrical Society of London*, vol. ii. p. 201. London, 1861.

Treatment.—Dr. David Davis, who paid much attention to this affection, recommended the local abstraction of blood by leeches, the application of blisters, the use of evaporating lotions, free and constant exposure to the action of the atmosphere, and the internal exhibition of digitalis with blue pill.—Dr. R. Lee seems to place most reliance on the repeated application of leeches above and below Poupart's ligament.—In the cases which have been under my own observation, the patients have invariably been in a feeble state of health, and consequently such remedies as venesection, leeches, calomel, and digitalis have not been thought of. I have generally at first employed sedative and alkaline fomentations, perfect rest, simple diet, and opiates to relieve the pain. The fluid in which the fomentation flannels are to be wrung out is made by adding one pound of bicarbonate of soda, and one ounce of extract of poppies, to each gallon of boiling water. The flannels ought to be changed every thirty minutes; they are to be applied over the whole limb, and even over the groin and lower part of the abdomen if there be tenderness; while the heat and steam from them are to be retained by the use of impermeable cloth. At a later stage, great benefit has seemed to accrue from attempts to improve the condition of the blood; as by the use of wine, brandy, milk and raw eggs, animal food, ammonia and bark, &c. Where there has been any offensive vaginal discharge, injections of simple warm water, or of some weak disinfectant solution, have been used every night and morning.

Flying blisters and stimulating liniments to the limb, are now and then useful when all the acute symptoms have subsided; but I have found nothing answer so well as efficient bandaging. At this stage also I have seen much good from the employment of the iodide of iron, or of the chlorate of potash and bark; as well as from quinine, cod liver oil, and temporary change of residence to the seaside.

V. INFLAMMATION OF THE LYMPHATICS.

The absorbent or the lymphatic [*Lympha* = water] system includes the superficial and deep lymphatic vessels, the glands through which these ramify, and the lymphatics of the small intestines—the extremely delicate lacteal or chyliferous tubes. The lymphatic vessels are distributed through almost every vascular organ and tissue in the body. In the brain and spinal cord they take the form of perivascular canals or sheaths, but the membranes of these nervous centres are supplied with them. The lymphatic or absorbent glands are found in the neck, axilla, front of the elbow, groin, and popliteal space; in the thorax, about the anterior and posterior mediastina; and in considerable numbers in the abdomen —in the mesentery, as well as by the side of the aorta, vena cava, and iliac vessels.

Inflammation of the lymphatic vessels, or angeioleucitis [from ’Αγγεῖον=a vase or vessel; λευκὸς = white; terminal *-itis*], may result from external injury, or from the absorption of some deleterious matter. The vessels are seldom, if ever, attacked without the glands being involved in the morbid action; though the glands occasionally become inflamed while the vessels remain healthy.

The best examples of angeioleucitis are seen in the case of punctured dissection wounds with the absorption of corrupting animal matter; in carbuncles and abscesses, from the absorption of unhealthy pus; and in accidents where the consequent inflammation assumes an erysipelatous character. The course of the inflammation is shown by the formation of bright red streaks, which run upwards from the wound in the direction of the absorbents, along the previously healthy surface as far as the glands in which the vessels are merged; these streaks or lines being tender to the touch and hard like little cords, while they are the seat of stinging burning pains. The glands in connexion with the affected vessels quickly become involved, and get swollen and acutely painful; while the whole limb is rendered more or less puffy and tender. The constitutional disturbance is always great; there being in many instances chills or rigors, nausea and constipation, fever, prostration, restlessness, and considerable mental depression. The inflammation will either terminate in resolution; or it may end in suppuration, with the formation of large abscesses, or with infiltration of matter around the lymphatics and ganglia; or it may pass into a chronic stage, causing induration which will probably remain for months; or it may actually lead to fatal exhaustion, or to death from ichorhæmia. Not unfrequently also, inflammation of the lymphatics becomes complicated with erysipelas, or with phlebitis, or even with both.

The remedies for this affection are few, but they require to be promptly employed. Any wound which may be present should be bathed and poulticed, while the whole limb is to be assiduously fomented. Considerable relief will be afforded by freely painting the inflamed lines with extract of belladonna, or with belladonna and extract of poppies (F. 297), before applying the fomentation flannels. Care is to be taken that the air of the sick-room is pure and cool. The patient is to be abundantly supplied with refreshing drinks, or he may be allowed plenty of ice. The diet is to consist of milk, and strong beef tea; while the depression which early sets in is to be combated by the administration of wine or brandy. The bowels are to be cleared out by a dose of jalap, or by stimulating enemata. Then no drug, as a general rule, proves so useful as the carbonate of ammonia; which may be given in oft-repeated doses, with bark or some bitter infusion (F. 371). When urgent typhoid symptoms, with clammy sweats and delirium, set in, care must be taken that the blood is not overcharged with ammonia; but if it be so, the hydrochloric acid (F. 357) ought to be prescribed, while brandy is to be administered at short intervals. If suppuration, either diffused or circumscribed, take place, the pus must be evacuated by free incisions.

VI. INFLAMMATION OF THE LYMPHATIC GLANDS.

Inflammation of the lymphatic glands, or adenitis [from ᾽Αδὴν = a gland; terminal *-itis*], is not only an accompaniment of angeioleucitis, but it may occur independently of such an affection. Thus, in children recovering from one of the eruptive fevers, particularly scarlatina, the cervical glands are apt to become swollen and tender, the inflammation not unfrequently ending in suppuration. Again, in strumous subjects adenitis is a very common disorder; though in such the inflammation is by no means always of a simple character, being often due to the insidious deposition of tubercle in the gland.

The commencement of acute adenitis is often indicated by a feeling of malaise, followed by slight chills and symptomatic fever. Then, one or more glands become swollen, hot, hard, tender, and painful; the swelling being chiefly due to infiltration of the areolar or connective tissue of the gland. As the tumefaction increases, the skin over it becomes reddened or livid; while if the convoluted tubes get obstructed, the surrounding tissues will be rendered œdematous. Unless resolution occur, or unless the acute symptoms gradually subside into chronic inflammation, there will be suppuration in a few days; an abscess forming in the interior of the gland, or in the connective tissue which surrounds it. The latter event is not uncommon; and it may be recognised by finding that the tumour is no longer circumscribed and moveable, as it remains when the pus forms only in the interior of the gland.—In cases where the morbid action is chronic or subacute from the commencement, or where the acute merges into the chronic form, we find induration with persistent enlargement; the pain and heat being slight, while the skin retains its natural colour, and the connective tissue remains unaffected so that the gland is moveable.

Strumous enlargement and inflammation are usually chronic; the glands of the neck, and those about the base and angle of the lower jaw being more frequently affected than any others. The subjects of this form are especially young children, though it is not a rare affection of delicate adults—of such as manifest a strumous diathesis. There are no premonitory symptoms, as a rule; the first indication of the disease being a swelling of one or more glands. If the mischief increase, however, and especially if there be a tendency to suppuration, the system will suffer considerably; and the already weakened patient becomes irritable and restless, his tongue gets furred, his pulse is rendered quick and feeble, the bowels become costive, the appetite fails, while the urine will be found scanty and loaded with urates. Where the general health is very bad, the inflamed glands rapidly undergo disorganization; and the surrounding connective tissue and skin getting involved, extensive indolent ulcers result. When the lymphatic glands of the mesentery are affected with strumous inflammation, a special and often fatal form of disease is set up which will be described in a subsequent section.

The treatment of simple acute adenitis is much the same as that required for angeioleucitis. In the strumous variety we have especially to improve the general health; and consequently such remedies as quinine and iron (F. 380), iodide of ammonium and bark (F. 38), the so-called chemical food (F. 405), and cod liver oil are all valuable remedies. The diet must be nourishing, with a full allowance of milk; while no treatment will be of permanent advantage unless the patient has the benefit of pure air. Local applications are of comparatively little value; but in the early stages of the inflammation water dressing soothes the irritable glands better than poultices. If there be much pain the application of belladonna and extract of poppies (F. 297) in combination with bread and water poultices, affords great relief. When the inflammatory action, however, has subsided, and the glands merely remain indurated, the application of iodine, or friction with the red iodide of mercury ointment diluted with lard will often produce absorption. Injection of iodine into the substance of such glands has also proved successful, and an indolent glandular abscess may be emptied by the aspirator. As a rule, enlarged glands are not to be extirpated.

The nature and treatment of adenitis of a venereal origin has already been described. It is also unnecessary to speak here of the affections of these glands from cancerous infiltration; such disease being much more commonly a secondary than a primary formation.

VII. DILATATION OF THE LYMPHATICS.

A partially hypertrophied and varicose state of the lymphatic vessels has been observed by many authors. The dilatation is sometimes congenital; or it may be due to some obstruction of the convoluted tubes in the glands; or it will have arisen from the pressure of an aneurismal or other tumour on the trunks in which the vessels terminate.

Dr. Carswell mentions the remarkable case of a young man about twenty-six years of age, who was seized with severe abdominal pains and vomiting. There was a swelling in each groin, nearly as large as an orange, and the cause of suffering was therefore attributed to strangulated hernia. Owing to the great prostration, no operation could be attempted. After death, the only remarkable circumstance observed was enormous dilatation of the lymphatics from both groins upwards, including the thoracic duct. The two swellings in the groins, which had actually been treated as double herniæ, a truss having been worn from boyhood, were found to be produced by great dilatation of the lymphatics of the inguinal glands. As no obstacle could be detected throughout the course, or at the termination, of the thoracic duct to account for the dilatation of the lymphatics, it was concluded that the condition was a congenital malformation.*

Dr. Grainger Stewart has recorded the history of a man who died at the age of sixty from heart disease. On examining the small intestine, a number of whitish-yellow patches were seen, varying in size from that of a pin head to that of a small bean, scattered throughout its coats. Some of these patches were quite granular on the surface, and evidently connected with the mucous membrane; others were smooth, rounded, and lobulated like minute fatty tumours, and evidently lay in the submucous layer, for by a little careful dissection they could be separated from the mucous membrane on the one side, and from the muscular layer on the other; while a third set, again, much less abundant, consisted of a combination of the other two. On microscopic examination, those of the *first* kind were found to be made up of groups of villi greatly distended as in the process of digestion—*i.e.*, they were dark and opaque. On tearing them, a milk-like fluid escaped which presented microscopically the characters of milk or chyle. The villus then collapsed, and there was no appearance of the bloodvessels having been distended; wherefore it seemed obvious that the whole enlargements depended upon the presence of the milk-like fluid. Those of the *second* kind resembled small fatty tumours, and were situated between the mucous and muscular coats. Some consisted of a single lobule, others of several lobules. On pricking any of them, a milk-like fluid containing aggregations of fatty granules flowed out, and the walls of the particular lobule collapsed.—Dr. Stewart also quotes a corresponding case from Rokitansky, the chief features in which were these:—The body of a man, who died at the age of sixty-two, presented œdema of the subcutaneous areolar tissue, and very considerable effusion of a milk-like fluid, in both the pleural and peritoneal cavities; dilatation and hypertrophy of the heart, with thickening and shortening of the mitral valves; thickening of the mucous membrane of the stomach in the pyloric half, and a white and swollen condition of the intestinal walls; while the subpleural lymphatic vessels were distended, and still more the chyle vessels and the thoracic duct. They presented, from the bowel to the first series of lymphatic glands, knot-like dilatations, full of a white soapy or greasy-looking matter, which became diffused in water. It consisted of fatty granules, crystals of margarin, and some apparently nucleated cells. The lymphatic glands contained similar small deposits, and in the thoracic duct there were some dilatations.*

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* *Pathological Anatomy.* Article "Hypertrophy." London, 1838.

Dilatation of the lymphatics appears occasionally to lead to a rupture of their coats, in the same way that varicose veins sometimes give way. Dr. W. H. Day has recorded such a case, the rupture occurring in the inguinal region, with profuse discharge of a milky fluid. Dr. Carter's cases of chylous urine, in which there was probably a leakage from the lacteals into some part of the urinary track, have been already referred to. The same gentleman has also published certain facts, which appear to indicate a close connexion between a varicose state of the lymphatic system and elephantiasis Arabum attacking the scrotum.†

VIII. TABES MESENTERICA.

Tabes Mesenterica [*Tabes* = a consumption, from *tabeo* = to melt away: Μεσεντέριον = the membrane which connects the intestines together,—*μέσος, ἔντερον*] is the name given to a tubercular or strumous degeneration of the mesenteric glands. The disease might appropriately be termed abdominal phthisis.

To understand the *pathology* of mesenteric disease it is necessary to remember that the tubercular matter becomes effused into the glands themselves, more or less destroying their structure, and of course preventing the passage of the chyle through the lacteals which traverse them. Consequently there is impaired nutrition, varying in grade according to the extent of lymphatic obstruction. The glands are found enlarged, and affected in different degrees; in some the abnormal product being tough and almost fibrous, in others degeneration having so far advanced that it is soft and pulpy, while in a third class there is only a calcareous deposit owing to the albuminous portion having been absorbed. Mesenteric disease particularly affects infants and young children; but it is by no means as frequent as the old authors believed, who regarded every child with a swollen belly as a victim of it.

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* *Edinburgh Medical Journal*, p. 448. November, 1863.

† *Transactions of the Medical and Physical Society of Bombay.* New Series, vol. vii. p. 186. Bombay, 1862.

The *symptoms* indicative of *tabes mesenterica* are chiefly the following :—There is pain in the bowels, more or less constant and sometimes severe, causing the child to keep his legs drawn up towards his belly. The lips are of a deep red colour ; and the angles of the mouth are covered with small ulcers, or the whole lip is fissured. The bowels are variable, though generally relaxed ; the motions being often unhealthy, and extremely fetid. The abdomen is swollen, tense, and the parietes have a peculiar hardness ; while the other parts of the body waste away, owing to the obstruction of the chyle ducts, until an extreme degree of emaciation exists. There is great pallor and general debility : the weakness increases very rapidly. Symptoms of pulmonary consumption may supervene, or the brain may become implicated, or the child may die worn out by the abdominal disease. Recovery does sometimes occur, however, when treatment is resorted to before the functions of the glands are much impeded. In these favourable cases the period of convalescence will be very slow, and great caution must be employed to prevent any relapse.

The *diagnosis* is not always very easy, and there are two or three disorders with which this disease is apt to be confounded. Thus, strumous infants not unfrequently suffer from very obstinate diarrhœa, as a sequela of some exhausting disease ; or a looseness comes on owing to insufficient nourishment, or to the child being kept in a damp offensive atmosphere, &c. The evacuations also are not only very numerous, but unhealthy ; consisting of greenish mucus, with undigested food. The countenance becomes anxious and aged ; the skin is found to be harsh, the breath offensive, the tongue dry and aphthous, and the stomach irritable. Moreover, the little patient is restless and very fretful. If removal of the cause, and the use of such remedies as milk and lime water, logwood and opium, ipecacuanha and catechu, port wine or brandy, &c., fail to effect a cure, extreme exhaustion sets in which soon ends fatally. After death the mucous membrane of the alimentary canal will be found quite normal, while the mesenteric glands may be merely swollen and congested—probably as the consequence of the irritation, although possibly as its cause.

Again, hydrocephalus in its early stages somewhat resembles strumous disease of the abdomen. But in the former the cerebral oppression is greater, sickness is more troublesome and constant, the mind is duller, there may be strabismus, and the abdomen is found flattened rather than distended.

In tuberculization of the bronchial glands, there is greater disturbance, at an earlier period, than when the mesenteric glands are alone diseased ; owing to the fact that in enlargement of the former the air tubes soon become compressed and their vital functions interfered with, the unyielding walls of the thorax offering a marked contrast to the flexible parietes of the abdomen.

The general character of the symptoms, as well as of the pathology, is the same in both cases.

Tubercular peritonitis is hardly to be distinguished from the disease under consideration, with which indeed it is often combined. Fortunately the distinction is unimportant.

The *treatment* of tabes mesenterica must consist in the use of mild nourishing food adapted to the child's age and strength; asses' milk, goats' milk, soda water with milk, cream, and farinaceous preparations being very useful. Port wine and beef tea are valuable agents. Cod liver oil will be of much service in many cases; especially when given with tonics, and sometimes with small doses of iodide of potassium and the ammonio-citrate of iron (F. 31, 32, reduced in strength according to the patient's age). In several instances I have seen great benefit from the employment of "chemical food" (F. 405); as well as from small doses of the hypophosphite of soda and bark. Raw meat, minced very fine, is not unfrequently taken greedily by children with mesenteric disease, marked improvement resulting. Where the motions are very offensive, a few small doses of mercury and chalk combined with a grain or two of the powder of ipecacuanha and opium, or with the aromatic powder of chalk and opium, prove serviceable. Astringents to check the diarrhœa, frictions over the abdomen with the common soap or opiate liniments, hot linseed poultices to relieve any pain, warm clothing, and the employment of a flannel bandage round the body will frequently be necessary. Care must also be taken that the air of the child's apartments is kept healthy; it being especially necessary that the sleeping room should be of a good size and properly ventilated.

The invigorating influence of sea air is as clearly apparent in the early stages of tabes mesenterica as it is in other forms of tuberculosis. Children who have refused both food and medicine, and who would pine and die in the unhealthy courts and narrow streets of large cities, seem to imbibe a new life with the inspiration of a pure air, loaded with saline particles. Materials which the stomach previously refused to digest, become converted into healthy chyme; the blood circulates with renewed activity through the enfeebled frame; and while nutrition becomes stimulated, the secretions from the various glands gradually appear of a more healthy character, the little patient ceases to be irritable and fretful, and the muscles lose their soft flabby feel. After a few days' residence at Margate, Broadstairs, Folkestone, Eastbourne, Brighton, Scarborough, &c., when the child is becoming acclimatized, bathing may be tried; commencing with warm salt water baths every morning, and gradually lowering their temperature until a healthy glow follows quickly upon the use of tepid water. As a rule, strumous children seldom derive any benefit from cold bathing; while a dip in the open sea often produces a greater shock than they can well bear. Moreover, to force a timid and delicate child into the water is a piece of cruelty to which no medical practitioner should ever give his consent.

The preceding remarks show that the great aim of treatment in mesenteric disease must be to improve and fortify the constitution. All remedies which interfere with this object can only prove injurious. The use of salines, aperients, tartarated antimony, digitalis, calomel, mercurial liniments, and leeches is to be condemned ; for if some of such agents inflict no positive mischief, they certainly cause the loss of valuable time. Our main reliance, in short, must be placed on food which can be easily assimilated, on cod liver oil, and on sea air.

PART VIII.

DISEASES OF THE ALIMENTARY CANAL.

I. DISEASES OF THE TONGUE.

The tongue is exposed to many sources of disease and injury. As this organ is abundantly supplied with blood by the lingual, facial, and ascending pharyngeal arteries, it follows that wounds of it are often productive of copious hæmorrhage. Being highly sensitive, comparatively slight diseases of its mucous membrane, or of its muscular fibres, are commonly very painful, owing to its free supply of nerves. In each half we find the hypoglossal (motor) nerve, and two nerves of sensation—the gustatory branch of the fifth, and the lingual branch of the glosso-pharyngeal.

1. GLOSSITIS.

Inflammation of the tongue, or glossitis [from Γλῶσσα = the tongue; terminal *-itis*], is not a very common affection, now that mercury is seldom used so as to produce salivation. The inflammation is generally met with as an accompaniment of other diseases, rather than as an idiopathic affection. Occasionally it leads to the formation of an abscess, which may be mistaken for a tumour until the pus is evacuated.

When glossitis arises idiopathically, it gives rise to fever and mental depression and general weakness. Where it is consequent upon some other affection, great constitutional disturbance may quickly ensue. In all cases the local symptoms are the same, consisting chiefly of pain and swelling and watery discharge. The tongue is found of a deeper red than usual; while occasionally the swelling proceeds to such an extent that the cavity of the mouth is not large enough to contain the organ, and it therefore projects beyond the teeth. This condition, which often occurs very rapidly (sometimes in a few hours), is attended with urgent dyspnœa, and requires prompt treatment. Purgatives should be administered by means of enemata; followed by quinine (F. 379). Ice can be freely applied to the tongue itself with very good effect. Where the œdema is great no practice gives such speedy and certain relief as making one or more longitudinal and free incisions along the upper surface of the organ. By such incisions a quantity of sanguinolent serum drains away, while they let out pus if the morbid action has gone on to suppuration. In the event of suffocation being threatened, owing to the enlargement of the root of the tongue, tracheotomy ought to be performed. Mr. Benjamin Bell saved a patient's life by this operation, in a case of glossitis produced by mercury.

2. ULCERS OF THE TONGUE.

There are several varieties of these ulcers; most of them being exceedingly irritating or painful, and often very difficult to heal.

The whole of the upper part of the tongue sometimes becomes superficially ulcerated, the raw surface feeling heated and tender. Severe and long-continued disorders of the digestive organs are the chief source of this form. The ulceration can only be cured by attention to the diet, particularly forbidding the use of all alcoholic stimulants; by the employment of borax gargles, or by painting the surface frequently with the glycerine of borax; and by the administration of such remedies as bismuth, pepsine, quinine, &c.

Where there are ulcerations as the result of simple inflammation, they are usually small and superficial, without definite shape, and very sensitive. They are seated about the tip or near the frænum rather than at the sides of the organ; and they cause great annoyance in eating. They are to be healed by mild diet, antacid aperients, and the application of sulphate of copper; together with the extraction of carious stumps, or the removal of the tartar from any teeth which may be irritating the raw surfaces. Ulcers occurring after ptyalism are easily distinguished by the accompanying affection of the gums and fetor of the breath. They will be most readily cicatrized by the administration of saline purgatives; by a mixture containing chlorate of potash (F. 61); and by the use of a gargle formed of chlorate of potash and tincture of myrrh in water, or of five grains of sulphate of copper to each ounce of water.

In all cases of sore tongue the stumps of teeth should be removed, or the sharp edges of broken ones filed down if they are not extracted, while the tartar from the inner surfaces of all the teeth should be scraped off.

Syphilitic ulcers may be secondary or tertiary. The secondary ulcerations are generally superficial, and are attended with similar disease of the lips or other secondary symptoms. The ulcers appear at the sides of the tongue, are very sore, and are very intractable; while they may be best treated by the mercurial vapour bath (F. 131) every night, or by the inunction of mercurial ointment, or by the green iodide of mercury and conium (F. 53), together with the application of nitrate of silver, or a strong solution of bichloride of mercury. The deep tertiary syphilitic ulcers usually commence as inelastic indurations, which slough in the centre; the sores then becoming deep and excavated, and the edges ragged and sloughy or thickened and hard. Their most frequent seat is the upper and back part of the tongue, but they are sometimes seen on the under surface at the sides. They are accompanied by other tertiary symptoms; and consequently the various viscera should be examined so as to make sure that no gummata are being developed. They are generally cured—at least for a time—by full doses of iodide of potassium (F. 31), and the frequent use of a gargle of one drachm of the dilute nitric acid to eight ounces of water.

The remaining forms of ulcerations are either strumous, tuberculous, or cancerous. They occur for the most part with other symptoms of these affections; while the strumous and tuberculous varieties require the general constitutional treatment proper for these affections, especially cod liver oil and milk and sea air.

3. CANCER OF THE TONGUE.

Cancerous disease of the tongue will be of the *Epithelial* form, or it may present the characters of a firm *Scirrhous* tumour, or it now and then proves to be of the *Medullary* kind. Of whichever nature, the disease has a tendency to run on speedily to ulceration; a foul sloughy sore forming, with ragged everted edges, and an indurated base.

The three chief *symptoms* are,—severe pain, profuse salivation, and the cancerous cachexia. At first the patient complains only of a sore tongue, with pain on deglutition; but soon the suffering becomes acute and most wearying, while frequent sharp pangs dart along the Eustachian tube to the ear. The secretion of saliva is very abundant; the fluid either flowing almost constantly from the mouth, or passing into the throat and causing an irritating cough. As the ulceration extends (perhaps involving the mucous membrane of the mouth and gums) the discharge becomes most fetid. The cachexia is early developed; for cancer of the tongue, like that of all the soft vascular tissues, runs a rapid course. The nights are passed in misery; there is pain, with difficulty in articulation and deglutition; there are occasional attacks of hæmorrhage; the whole tongue becomes much swollen, while it may even slough; and cancerous deposit takes place in the sublingual and submaxillary glands, as well as in the surrounding tissues. Sometimes the mouth becomes almost filled with an extensive ulcerated fungus; so that suffocation may be threatened. But generally speaking, death occurs from exhaustion.

The *treatment* of these cases is to be conducted so as to relieve pain and support the failing powers as far as possible. Opium in large doses becomes absolutely necessary; and by its judicious use, as already shown, much ease may be given for a time. Bleeding is to be checked by the application of powdered matico leaf, or of a saturated solution of perchloride of iron, or of ice. Fluid nourishment—milk, cream, raw eggs, and essence of beef must be freely allowed, after the patient finds it impossible to masticate and swallow solid food.

As a curative measure, removal of the diseased parts or of the entire tongue is generally useless. But excision can justifiably be resorted to, in some exceptional cases, for palliating the symptoms; as where suffocation is threatened from the swelling, when the pain is very intense, when the flow of saliva is so profuse as to keep the patient wet and miserable, or when there are repeated attacks of hæmorrhage. That great relief often follows the operation cannot be doubted; and patients (even medical men, fully aware of the inevitable termination of the disease) will sometimes beg for a second operation, in the hope of gaining an extension of ease. Whether the diseased structure should be removed by the knife, écraseur, or ligature must depend upon the part of the tongue involved and the extent of the morbid action. Unless the whole organ has to be removed the knife is probably to be preferred to the écraseur. The ligature has now been discarded by almost common consent. Several cases have occurred in which the entire tongue has been removed, and the operation recovered from; the patients having subsequently been able to masticate solid food, swallow fluids, and enter freely into conversation without causing any suspicion of the loss they had incurred.

To diminish the sensibility of the tongue, and to check the secretion of saliva, Mr. Moore, of the Middlesex Hospital, has recently (1861) repeated the operation of dividing the gustatory branch of the fifth nerve, as first suggested by Mr. Hilton. By section of this nerve between the disease and the brain, relief is immediately afforded; the pains and tenderness, the salivation, and the reflected irritation of the fifth nerve all disappearing. In some five cases, the relief was permanent so far as the gustatory nerve was concerned: though when the disease invaded the area of the glosso-pharyngeal nerve, new pain arose. To effect division, Mr. Moore cuts through all the soft tissues on the inside of the ramus of the jaw by an incision immediately behind the last molar tooth, extending three quarters of an inch in a direction from the angle of the jaw. The structures divided by such an incision are the mucous membrane and a part of the mylo-hyoid muscle, with the gustatory nerve descending forward between them, about half an inch from the tooth and nearly at a right angle with the direction of the incision. It is advisable to operate with a curved knife, as the alveolar ridge might shield the nerve from the edge of a straight one; while it is also necessary to cut outwards quite to the bone. Section of the nerve may, however, be accomplished from the inside of the mouth. In one instance Mr. Moore combined ligature of the corresponding lingual artery with this operation; so as to diminish the supply of blood to the affected part.

4. CRACKED TONGUE, TUMOURS, &c.

Cracked tongue is sometimes a troublesome and inveterate affection, rendering eating and speaking very painful. Where there is no specific condition of the system, or no derangement of the alimentary organs to account for it, I have found a lotion of borax and glycerine (F. 268) act very advantageously; as does also one of bismuth, glycerine, and rose water. Iodide of potassium with steel or sarsaparilla (F. 31, 32) can likewise be administered, if local remedies fail to effect a cure. Chlorate of potash (F. 61) frequently succeeds. The clefts or fissures may be a couple of lines in depth, and so numerous that they form an irregular series of grooves.

The surface of the tongue occasionally presents *patches of baldness*—that is to say, we find one or more smooth, oval, glossy patches. There is no ulceration or fissure, and the remainder of the surface of the organ looks healthy. This appearance is combined in many cases with psoriasis palmaris; and is probably very often indicative of a syphilitic taint, when it will require a prolonged course of the perchloride or periodide of mercury (F. 27) for its cure.

Warts and condylomata are not uncommon diseases of the mucous membrane of the tongue; the former merely requiring excision, while the latter demand the ordinary anti-syphilitic medicines.

Papillary patches are sometimes met with; or, in other words, we find large spots of the mucous and submucous tissue thickened, tough, brawny, coarsely papillary, and perhaps fissured. This condition of the tongue has been described by Mr. Hulke, Sir James Paget, and Mr. Fairlie Clarke under the name of *ichthyosis linguæ;* it has also been called *psoriasis* of the tongue, and consists of an hypertrophy of the papillary layer of the mucous membrane and epithelium. The patches produce an unpleasant feeling, with thickness of speech; they must not be mistaken for cancer, but they may run on into epithelioma. They are in many cases attributable to smoking, and they may generally be cured by the administration of the iodide of potassium, with alkaline spray as a local application. When much induration is present, conium, in large doses, appears to be an efficacious remedy in producing softening.

Hypertrophy of the tongue is a rare affection. It is usually congenital. The enlargement generally becomes so great that the mouth is found too small to contain the organ; and a large portion is therefore constantly protruded. In a few instances the prolapsed part has reached below the chin. Removal will have to be accomplished by the knife, ligature, or écraseur. As the operation is not without danger, attempts have been fruitlessly made to effect a cure by continued pressure.

When the frænum linguæ extends to the very tip of the tongue, the individual is said to be *tongue-tied.* This condition is by no means so common in infants as the public imagine. Where it really interferes with the movements of the organ, the frænum should be divided ; the point of the scissors being directed downwards, to avoid wounding the ranine arteries.

Encysted or *fatty tumours* form in the tongue or beneath it, and may require extirpation. *Firm tumours,* made up of fibrous and areolar tissue, have been found in a few rare instances growing from the tongue. When pediculated they had better be snipped off. There is no fear of hæmorrhage, unless an artery can be felt in the stalk ; in which case the écraseur should be used. *Abscesses* are very seldom met with in the tissue of the tongue. When they occur, a free incision must be made to evacuate the pus.

Nævus of the tongue is most times congenital. Even though half the organ be involved surgical interference is seldom necessary. Some years since I saw a youth the whole of whose tongue seemed to be covered with small tortuous veins, which have contracted with time. In the event of repeated attacks of hæmorrhage extirpation by ligature may possibly be needed.

And lastly, *Ranula* [*Rana* = a frog ; because the voice is said to be croaking, like a frog's] is a semi-transparent fluctuating swelling, perhaps as large as a walnut, situated under the tongue. It consists of a dilatation of the duct (Wharton's) of the submaxillary gland. A seton should be passed through the cyst, or a portion of the anterior wall can be excised.

II. INFLAMMATION OF THE MOUTH.

Stomatitis [Στόμα = a mouth ; terminal *-itis*], or inflammation of the mouth, is a common disease in young children. It may occur in three forms—*i.e.*, according as the principal seat of the morbid action is situated in the mucous follicles of the mouth, the substance of the gum, or in the tissues of the cheek.

1. FOLLICULAR STOMATITIS.

Inflammation of the mucous follicles of the mouth—the aphthous stomatitis of some authors—is the mildest form of stomatitis. It may be idiopathic, or it may occur as a sequela of some of the eruptive fevers—as measles, &c. The attention is first directed to the child's mouth by observing that a difficulty seems to be experienced in sucking, that there is a more free secretion of saliva than usual, and that the submaxillary glands are tumid and tender. The patient is also restless and feverish, has but little appetite, seems to experience pain in deglutition, and frequently suffers from diarrhœa with very offensive evacuations. On examination, numerous small vesicles are found about the inside of the mouth, on the tongue, and on the fauces; which vesicles by bursting form little ulcerations covered with a dirty white or yellowish slough. These ulcerations sometimes remain separate, though more commonly they coalesce, forming a sore of considerable extent. In either case, as they heal, fresh vesicles appear, which again degenerate; and so the morbid action may continue for some weeks. When follicular stomatitis occurs as a concomitant or sequela of measles, it may become associated with diphtheria and produces an alarming malady.

For the greater number of cases very simple *treatment*, such as that presently to be recommended for thrush, suffices to effect a cure.

2. ULCERATIVE STOMATITIS, OR NOMA.

This disease attacks the gums; the ulceration sometimes progressing to such an extent as to destroy these parts and denude the teeth.

Noma [Νέμω = to corrode], or water-canker, produces heat of the mouth, an increased flow of saliva, offensive breath, swelling of the upper lip, and enlargement with tenderness of the submaxillary glands. On looking into the mouth we shall see that the gums are swollen, red or violet-coloured, readily bleeding to the touch, and covered with a layer of pulpy greyish matter. If the disease be allowed to creep on unchecked, the gums will get destroyed by the ulceration; the teeth becoming exposed and loosened until they fall out. The morbid action also spreads to the mucous lining of the cheeks, which become covered with irregular sloughing ulcerations; while the tongue assumes a swollen and sodden appearance. Ulcerative stomatitis is not uncommon among the poor. It occurs for the most part in weakly children (between one and eight years of age) who have been badly nourished, and exposed to cold and damp.

The *treatment* of this disease is not difficult; inasmuch as we possess in the chlorate of potash a remedy which may almost be deemed a specific. Five grains of this salt ought to be given every four or six hours to an infant one year old, in a little sugar and water. Pure milk and good broths will also be required. When the ulcerations have healed, bark or quinine should be administered.

3. GANGRENOUS STOMATITIS.

Gangrenous stomatitis, or cancrum oris, or sloughing phagedæna of the mouth, is a much more formidable affection than either of the foregoing. It is met with in children of debilitated habits, between the ages of two years and five or six.

The *symptoms* are generally these:—The child is out of health, and evidently weak. There is loss of appetite, wasting, and restlessness. The child dribbles at the mouth; the gums are swollen and covered with specks of ulceration; while there quickly forms, on one cheek, a hard indolent swelling. On examining the cavity of the mouth, a whitish or ash-coloured eschar is seen in the centre of the cheek; which gradually increases until the slough has spread over the whole of the interior of the cheek, lips, and gums. The saliva is copious, and horribly fetid. Supposing the destructive action to continue, either perforation will occur or the entire cheek may become gangrenous. The alveolar processes are very likely to get involved, and ultimately to exfoliate. Of course with all this there must be great constitutional disturbance. Now and then a low form of inflammation attacks the peritoneum and mesenteric glands. Pulmonary complications are very apt to arise. The exhaustion rapidly becomes extreme, and the disease frequently ends fatally. The severe morbid action has often been unjustly attributed by the child's parents and ignorant nurses to the action of mercury; but it may occur when not a particle of this medicine has been given.

The *treatment* had better consist in the application of the nitrate of silver—in some instances, of the strong nitric acid—to the slough; in frequently syringing the mouth with solutions of chloride of zinc (F. 79), or of chlorinated soda (F. 254), or of the permanganate of potash (F. 78); and in the free administration of strong beef tea, pure milk, raw eggs or cod liver oil, wine or brandy and the chlorate of potash in decoction of bark.

The effect of mercury upon the gums and teeth varies according to the age and constitution of the recipient. Young children are certainly less susceptible to the injurious influence of this metal than adults; but cases are occasionally met with where great mischief has been produced, even in infants, by a mercurial course. Grey powder is unfortunately believed by the public to be the panacea for all infantile disorders, and hence it is administered on many occasions with great impropriety. Teething powders are largely sold, even amongst the intelligent portion of society; much illness resulting from their use in young children who would cut their teeth safely and almost painlessly, if parents could but be persuaded to cease their mischievous interference with a simple natural process. I have seen such severe inflammation of the gums (*gingivitis*) thus set up by the administration of some mercurial preparation, that the child could not venture to take the nipple into its mouth; while it has been rapidly wasting for want of food. Sometimes the gums and buccal mucous membrane become the seat of a widespread ulceration, with all the symptoms of cancrum oris. Where such violent action does not ensue, great mischief may yet be done to the teeth about to be cut; so that as they are shed they become dark-coloured, brittle, and very liable to rapid decay. The mischief, however, does not cease with the temporary teeth, the permanent ones being also affected, though perhaps in a less degree. It has seemed to me doubtful whether the iodide of potassium is of any use in these cases. Not unfrequently, when the child is first seen by a competent practitioner, there is so much exhaustion that all his endeavours have to be directed to maintaining life; and therefore recourse is had to small doses of brandy, to the restorative soup (F. 2), and to milk or cream, leaving the elimination of the mercurial poison to time.

4. APHTHÆ OF THE MOUTH.

Aphthæ [from Ἅπτω = to fasten upon] consist of small, round, white, elevated specks or patches, scattered over the tongue and lining membrane of the mouth. Every now and then these patches extend down the œsophagus into the stomach. They form a special disorder in infancy—*the thrush*: in adult age they are apt to arise in the course of other affections, when they are often the harbingers of death. In at least some forms of this disease, microscopical parasitic plants (the *Leptothrix buccalis* and the *Oidium albicans*) become developed in large quantity in and between the epithelial cells of the mucous membrane; the filaments and spores of these fungi rendering the epithelium friable, loose, and swollen. They are readily transferred from the infant's mouth to the mother's nipple. When the aphthous spots are abundant they will frequently coalesce, producing a dirty diphtherial-looking membrane. The chief general symptoms are restlessness, depression, difficulty in swallowing, cough, diarrhœa, and vomiting with feverishness and wasting.

The *treatment* of the thrush consists in the use of mild astringents and tonics, and the application of borax and glycerine (F. 250), or carbolic acid and glycerine, to the aphthous parts. A gargle of infusion of catechu, with or without a little borax, often answers capitally. The diet must be regulated, such nourishing food as is compatible with the age being freely allowed. Sir William Jenner states that in cases attended with the formation of parasitic plants, the application of a solution of sulphite of soda (sixty grains to one fluid ounce of water), suffices to remove the disease from the mucous membrane of the mouth in twenty-four hours. The secretions of the mouth being acid, the salt becomes decomposed, and sulphurous acid is set free, which at once destroys the parasite.

5. STOMATORRHAGIA.

Discharges of blood from the mouth and throat [*stomatorrhagia,* from Στόμα = a mouth + ῥήγνυμι = to break out] seldom give rise to any trouble, except when they occur during the last stages of scurvy or purpura, or after the excessive abuse of mercury. In some few instances, the small veins about the inside of the cheek and pharynx have become varicose; and when their walls have ruptured, severe or fatal bleeding has resulted. Ulcers about the tongue and fauces rarely bleed much; but once or twice glossitis terminating in gangrene has produced hæmorrhage which has only ceased with death.

Dr. Condie of Philadelphia has recorded a case where the blood flowed from the mouth in a stream, and on the gums being wiped with a sponge, it "was seen to start up at every pore from the whole surface." Now this would by many be regarded as an example of *hæmorrhage by exhalation;* just as the occurrence of cutaneous bleeding, where the blood is said to appear like a dew upon the skin, has been explained. Remembering the observations of Cöhnheim, it is necessary to criticise these views very cautiously. Still I cannot but think, that in such instances as have just been mentioned there is probably no hæmorrhage, strictly speaking. The discharge is simply an exudation of serum, which is coloured by the red matters of the dissolved or ruptured blood corpuscles.

It is worthy of note that prisoners, malingerers, hysterical females, and others, often feign hæmoptysis by pricking their gums, sucking out the blood, and mingling it with saliva and phlegm. This imposition will be readily detected on examining the mouth, as well as by noting the absence of all signs of either thoracic or abdominal disease.

The *treatment* of stomatorrhagia has to be conducted on the general principles already laid down. Medicines need not be administered unless the use of a cold astringent wash, or of tannic acid lozenges, or of ice, fails to stop the bleeding.

III. INFLAMMATION OF THE TONSILS.

Cynanche tonsillaris, or tonsillitis, or quinsy, or common inflammatory sore throat, manifests itself by fever and pain and considerable swelling of the tonsils.

The disease is often ushered in by chilliness or a rigor, which is followed by smart fever. On examination there will be seen considerable redness and swelling of the fauces and tonsils; these parts being at first shiny-looking, and then covered with mucus. The tongue is thickly coated; while there is an annoying discharge of viscid saliva. Complaint is made of the return of liquids through the nostrils on attempting to swallow, and of the difficulty of deglutition; together with (in severe cases) pain shooting from the throat to the ear, along the course of the Eustachian tube. Dyspnœa is but rarely present. The nights are sleepless. Under ordinary circumstances, the inflammation runs an even course, and terminates by resolution in a few days; merely leaving the tonsils temporarily swollen, or permanently enlarged. When violent and prolonged, however, the morbid action frequently leads to suppuration in one or both of the glands. Rigors generally announce the suppuration; the pain proving very severe until the abscess bursts, or is opened artificially.

The principal exciting cause of quinsy is cold. The liability to it is increased, during the youthful period of life, by repetitions of the attacks. It is doubtful whether it be contagious or not; but most practitioners assert that it is not.

The *treatment* required is usually very simple. The patient had better remain in bed, and breathe warm air not too dry. Milk and good broths are to be allowed. A few doses of some cooling saline purgative, and the application of hot fomentations or linseed poultices to the throat, will almost be all that is necessary. The steam of poppy water directed to the fauces gives great relief; and I have frequently found benefit from opiate gargles (F. 253). The inhalation of spray medicated with belladonna, or conium, or opium (F. 262), can also be recommended. Patients vary in opinion as to the ease afforded by sucking ice, in place of the hot applications. Blistering the outside of the throat, or the application of stimulatong embrocations—as the compound camphor liniment, has seldom done any good in my hands; and I much prefer using freely the extract of belladonna, and applying a large poultice over it. Guaiacum in large doses has been recommended as a specific in quinsy, but I have never found it of much service; guaiacum lozenges, however, appear frequently to arrest incipient attacks. Ammonia and bark (F. 371), or quinine and some mineral acid (F. 379), have appeared to me of far greater value.

When the inflammation has gone on to suppuration, it is generally thought necessary to open the abscess. My own opinion, however, is that in nine cases out of ten it will be much better to let the abscess burst. If interference be determined on, care must be taken to puncture the tonsil with a sharp-pointed curved bistoury, the cutting edge of which is to be directed towards the mesial line of the body; for it has on several occasions happened that an awkward and unskilful operator has, by inattention to this rule, wounded the internal carotid artery. Should such an accident happen, the officinal strong solution of the perchloride of iron must be quickly and freely applied to the wound; this excellent styptic having arrested the hæmorrhage in a case where, had it failed, a ligature would have been placed on the trunk of the common carotid artery.

Permanent enlargement and induration of the tonsils may result from acute inflammation; or this state can come on slowly in strumous or rickety children, as well as in weakly youths and young women. The enlargement is often so great, that the fauces appear to be almost blocked up; while it produces thickness of speech, more or less deafness, an uncomfortable sense of obstruction, and some difficulty in swallowing. Occasionally the swollen glands seem to prevent full and deep inspirations. Portions of the hypertrophied organs had then better be excised, if the application of iodine or nitrate of silver or tannic acid or friction externally with red iodide of mercury ointment fail to effect a cure. Mr. W. J. Smith has attempted to revive the method of cauterization by potassa fusa; but the proceeding must be much more dilatory and uncertain than excision with the knife and vulsellum forceps, or the guillotine invented for the purpose, while it possesses no countervailing advantages.* As regards constitutional remedies, steel and quinine, or iodide of iron, can be tried. Cod liver oil is often very useful, particularly if taken perseveringly at the sea-side for many weeks.

Cancer of the tonsil is very seldom seem. The only case which has been brought under my own observation occurred in the practice of Dr. Burnett, of Biggleswade. The patient was a poor woman sixty-eight years of age, whose pharynx was much obstructed by a firm medullary cancer of the left tonsil. The diseased mass was completely excised by Dr. Burnett, but I believe with only very temporary relief.

IV. DISEASES OF THE PHARYNX AND ŒSOPHAGUS.

The coats of neither the pharynx nor the œsophagus are as subject to disease, as the position and office of the musculo-membranous tube which they form might lead us to expect. Occasionally, however, this canal, becomes the seat of cancer, or of inflammation leading to stricture. A narrowing of the passage may also result from simple spasmodic contraction, but then it is only temporary; or from the pressure of aneurismal or intra-thoracic tumours; as well as from destruction of the mucous membrane and the effusion of a fibrinous material into the submucous areolar tissue, the consequence of swallowing the strong mineral acids or caustic alkalies. I have seen only one instance in which inflammation and ulceration occurred, followed by stricture, without any appreciable cause.

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* Richard Wiseman, Serjeant-Chyrurgeon to King Charles the Second, recommended the treatment of enlarged tonsils "by Extirpation: and that either by Abscission, at once cutting them off: or by actuall or potentiall Cautery. . . . . . The first Chirurgeon in my memory that attempted the Extirpating them was the late deceased Mr. *Ed. Mol.* an excellent operator. He attempted it upon a Person of Honour by actuall Cautery through a *Cannula* well contrived for that purpose. I afterwards saw him burn severall. He passed the Cautery through the body of them, and by repeating of it twice or thrice he burnt a hole through them, and accordingly crimpled them up. . . . . The way by potentiall Cautery is, by working with a Caustick-stone and other Escaroticks fixt in such an instrument as may serve to eat into them, without offending the neighbouring sound parts. To which purpose I make my way into the body of the gland, consuming it within; and at last the shell (or exterior parts) falls in pieces, and is so eradicated."—*Several Chirurgical Treatises &c.* Second Edition, pp. 329, 330. London, 1692.

Disease of the pharynx and œsophagus is attended by one prominent symptom—dysphagia [Δυς = difficulty + φάγω = to eat]. Difficulty in swallowing will likewise arise from tonsillitis, diphtheria, and croup; from that very uncommon affection polypus of the pharynx; from erysipelatous or other inflammation of the areolar tissue of the neck, or from retro-pharyngeal abscess; from paralysis of the muscles of deglutition; from malignant, syphilitic, and tubercular ulcerations about the epiglottis; from spasm of the pharynx and œsophagus, as in hydrophobia; from inflammation, ulceration, or œdema of the larynx; and rarely from disease of the laryngeal cartilages.

1. DISEASES OF THE PHARYNX, &c.

Every now and then, especially among the inmates of hospitals and workhouses, the walls of the pharynx become affected with a *diffused erysipelatous inflammation.* There is generally low fever, with rapidly increasing prostration. A muttering dreamy wandering of the mind is common; the occurrence of violent delirium being exceptional. Ammonia and bark (F. 371), wine or brandy, and good fluid nourishment must be allowed very freely. A dose of opium sometimes does good. The morbid action will perhaps run on to sloughing, or the patient may die from exhaustion without great care.

Follicular disease of the pharynx in which the follicular glands are greatly hypertrophied projecting on the mucous membrane, and giving it an irregular appearance, is one cause of chronic relaxed sore throat. It is not attended with much pain, but there is disagreeable muco-purulent secretion from the enlarged follicles which accumulates during sleep, and causes hawking and spitting in the morning on rising; it often also gives rise to a degree of hoarseness. The treatment required is the application of iodine or astringents in the form of spray together with the administration of tonics.

Follicular ulceration in the pharynx affecting the mucous membrane on the posterior pillars of the fauces may give rise to an apparently disproportionate amount of pain in the act of deglutition. The solid nitrate of silver, or a strong solution on a bent camel hair pencil, should be applied to the minute ulcerations.

Extensive syphilitic ulceration of the velum and fauces has in a few instances, after healing, produced narrowing and contraction of the upper part of the throat to such a degree as to impede deglutition and to obstruct respiration. It might perhaps happen in some particular case that incising the edges of the contracted opening would afford sufficient relief; but most frequently real and permanent benefit will only result from tracheotomy. In one case the tracheal tube was worn with great comfort for eight years. Deglutition had to be slowly and cautiously performed, great care being required to masticate solids very finely.

Partial or complete *adhesion of the velum to the posterior wall of the pharynx, with destruction of the uvula,* are more common than the foregoing; but they give rise to little or no difficulty in breathing or swallowing, though they cause discomfort; and when complete so as to cut off the communication between the pharynx and posterior nares, the sense of taste will be considerably impaired, all appreciation of flavours as of different meats, wines, &c., being lost, since these are really odours which reach the olfactory region by the posterior nares.

Elongation of the uvula may be the result of chronic inflammation, or of a generally relaxed state of the fauces. By irritating the pharynx and epiglottis the hypertrophied uvula produces an inclination to vomit at times, with a troublesome tickling cough, especially liable to come on when the patient lies down at night. If astringent gargles and ferruginous tonics fail to reduce the size of this organ, about two-thirds of it should be snipped off.

In some cases of stammering I have found a congenital malformation of the uvula present; but this state has probably exerted no influence on the impediment in the speech. As a rule it will be unwise to interfere surgically with such a structure.

2. RETRO-PHARYNGEAL ABSCESS.

This is a disease which only comes under observation once in a way. It is more frequently met with in children than adults. To Dr. Fleming is due the credit of first clearly describing this form of obscure suppuration, and of showing that it sometimes occurs during infantile life.*

Pathology.—The abscess is the result of acute or chronic inflammation of the loose connective tissue, situated between the posterior surface of the pharynx and the muscles on the anterior part of the spine. It may result from direct injury, or it will be the consequence of some general or specific constitutional derangement. Chronic abscesses in this situation are often connected with the strumous diathesis, and are of the same nature as the suppurations which take place in the cervical glands. Perhaps also, the mischief is more or less closely connected with a slight syphilitic taint. The inflammatory action often commences in a lymphatic gland at the back of the pharynx. In weakly subjects there is a fear that the inflammation will extend and produce œdema of the glottis.

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* *The Dublin Journal of Medical Science,* vol. xvii. p. 41. Dublin and London, 1840.

Symptoms.—The characteristic symptoms are preceded by general disturbance and fever, varying in intensity according to the constitution of the child. In almost all cases there is derangement of the cerebral and respiratory and circulating systems. At the commencement we find some amount of nausea, and soreness of the throat. Indications of difficulty in swallowing and breathing then manifest themselves; the latter soon becoming so severe, particularly when the child is placed in the recumbent posture, that suffocation may even appear imminent. There is also a fixed and retracted state of the head, with rigidity of the muscles at the back of the neck; a more or less locked state of the jaws; and a remarkable articulation—in children old enough to speak, the words being drawled out with pain and difficulty. The painful deglutition increases, until it is found that solids are refused and liquids regurgitated through the nose; frequent spasmodic attempts are made to swallow, as if there were something in the mouth; and there will possibly be convulsions, or stupor sometimes amounting to complete coma. Death has occurred from the abscess pressing the pharynx forwards on the epiglottis and rima glottidis, and causing suffocation. On examining the fauces, a firm and projecting round tumour is felt just beyond the base of the tongue, occupying either the median line, or inclined to one or other side. The abscess sometimes occurs as a sequela of fever; but usually it is idiopathic.

Diagnosis.—Without caution the symptoms are likely to be attributed to some cerebral affection, or to disease of the cervical vertebræ, or to inflammation of one of the respiratory organs. Attention to the phenomena just described, noting the cessation or diminution of the difficult breathing when the patient is raised from a recumbent to a sitting posture, with a careful examination of the throat, will remove all doubt as to the true nature of the case.

Treatment.—Surgical interference gives immediate relief, and soon effects a cure. The abscess must be opened with a bistoury, shielded to near its point by lint or plaster. The head ought to be steadied during the operation by an assistant; who is to press it well forwards directly the puncture is made sufficiently free, so as to facilitate the escape by the mouth of the pus which gushes out. A spontaneous opening but rarely occurs. And could we trust to its taking place there would be a fear that the abscess bursting suddenly, air and pus might be inspired into the trachea producing suffocation.

3. DISEASES OF THE ŒSOPHAGUS.

Simple ulceration of the œsophagus is a peculiar disease, the pathology of which is obscure. The chief symptoms are difficulty in swallowing, sometimes so great that deglutition is impossible and at last starvation occurs; pain at the epigastrium, or at the top of the sternum, or between the shoulders; with a frequent sense of nausea, emaciation and debility, more or less hunger, and considerable mental distress. Not unfrequently the ulceration extends into the trachea; while it has also been known to progress until it has made a communication between the œsophagus and one of the bronchi—especially the left, or between the œsophagus and either the pleura, pericardium, or aorta.

The treatment which is chiefly useful in these cases of ulceration consists of local applications of a solution of crystals of nitrate of silver (twenty grains to the ounce) ; or painting the part night and morning with equal parts of turpentine and glycerine; or the employment of spray inhalations, medicated with tannic acid or borax or iodine (F. 262). Ice should be freely and frequently sucked. Amongst the constitutional remedies most deserving of trial are, bark and quinine and steel, iodide of potassium, cod liver oil, a very nourishing diet, and sea air. I have little doubt that life might have been saved in some of the recorded cases where death was due to slow starvation, by the formation of a gastric fistula in the manner presently to be described.

Cancer of the œsophagus takes place at any one part of the tube, or through its whole length and circumference. The disease will be of the scirrhous, or medullary, or epithelial variety; the latter probably being more common than either of the other forms. When it occurs as a primary disorder, distant organs are but rarely implicated in the cancerous affection, possibly because of the rapidity with which it destroys life. Most cases are fatal considerably within a year from the commencement of the symptoms. Sometimes the disease has spread from the larynx to the œsophagus. Thus, a patient with cancer of the larynx will perhaps have to submit to tracheotomy to avoid asphyxia from obstruction of the glottis. Living for several months with a tube in the windpipe, the malignant ulceration may extend to the pharynx or œsophagus. Death will possibly be due to hæmorrhage, or to apnœa caused by food passing through the false opening into the bronchi.

The symptoms of œsophageal cancer at the onset are obscure. Complaint is at first made, somewhat suddenly, of sore throat and difficulty in swallowing. In one case under my observation the patient was much annoyed by a curious cutting pain in the ears, which symptom preceded the dysphagia.* The disease soon gives rise to decided obstruction, so that after a time not a particle of nourishment can be naturally passed into the stomach; while just above the constriction there is often formed a pouch where food accumulates until it is rejected. There is also considerable pain in the canal, or in the back, or in the shoulders; nausea and retching may be most troublesome; and irritating cough and hiccup are not uncommon. The patient wastes rapidly and to a wonderful extent; while the cancerous cachexia becomes plainly established. Death has occurred from hæmorrhage, one of the intercostal arteries having been laid open by the extension of the disease; or fatal loss of blood has taken place from the spreading of the ulceration through the coats of enlarged veins. In other instances the patient has sunk from sheer starvation—inanition; or from the ulceration involving important parts; or from destructive inflammation of the lung, owing to the implication of one of the pneumogastric nerves. We can only hope to give temporary relief by the use of opium and nutrient enemata; or by very cautiously passing a large gum-elastic catheter (No. 14 is a convenient size) through the contracted œsophagus, keeping the instrument there as long as it can be tolerated, and injecting food, &c. through it.

Simple stricture of the œsophagus is generally an after-consequence of the attempt to swallow some corrosive poison. Dr. Basham has recorded† a very interesting example, which well shows the course of events in these cases:—A young woman, twenty-two years of age, accidentally swallowed a very small quantity of soap-lees (a caustic solution of impure carbonate of soda). When admitted into the Westminster Hospital, five days subsequently, she was suffering principally from vomiting: this was relieved by calomel and opium, oleaginous laxatives and demulcents, milk and farinaceous diet, and by a blister to the throat and upper part of the sternum. An œsophagus tube passed easily. Ten days after her admission she was discharged apparently well. At the end of eleven months she was again admitted, suffering from urgent dysphagia. She appeared half-starved, and stated that for many weeks no solid food had been taken; and that lately the difficulty of swallowing had become so great that she could hardly get down liquid nourishment. A small gum elastic catheter, No. 8, was introduced with a little difficulty; and beef tea was injected into the stomach, to the great relief of the patient. This plan of treatment was continued, a larger tube being gradually used; while in a little more than twenty days so much improvement had taken place that she was able to swallow freely, and was therefore made an out-patient. She neglected to attend, however, and consequently eighteen days afterwards was re-admitted with her former symptoms aggravated. The same treatment was again successfully resorted to, and she was kept under longer observation by employing her as a hospital nurse. She was afterwards lost sight of for a time; but in about eight months—or twenty-six from the accident—she again, for the fourth time, applied, and was admitted. Only the smallest bougies could now be passed; nutritious enemata were employed; but in a few days she died, literally of starvation.

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* In another instance (seen during the summer of 1864, in consultation with Mr. Jenkins, of Philpot-lane, Fenchurch-street), the only symptoms through the progress of the disease were constant sickness and increasing emaciation. The former was so urgent and incessant, that a teaspoonful of iced water, merely taken into the mouth, at once brought on retching. And it was remarkable that this sickness commenced suddenly one afternoon at dinner, when the gentleman was apparently in sound health; while it did not cease for a single day until death took place, some four months afterwards. There was no cancerous cachexia; neither dyspnœa nor cough; and no pain anywhere, not even tenderness on making firm pressure over the neck or under the diaphragm. For many weeks the patient merely sucked a piece of linen dipped in water to check his thirst; all medicine and nourishment being administered by the rectum. At the autopsy, a slight mass of malignant disease was found occupying part of the œsophagus, but in no degree obstructing it, just above the termination of this tube in the cardiac orifice of the stomach. The irritation of the pneumogastric nerves would appear to have been the cause of the great irritability of the stomach.

† *Medico-Chirurgical Transactions*, vol. xxxiii. p. 99. London, 1850.

In the management of these cases we should rely on the repeated use of bougies, to prevent the stricture from closing. It will not do to trust to the chance of the progress of the contraction being spontaneously arrested while there is yet room for pultaceous nourishment to pass through the canal. The consequences of neglect are too serious to justify recourse to expectant treatment. The stricture must be gradually dilated; and then prevented from re-contracting if possible, by the employment of a large-sized bougie every ten or fourteen days for many months. One lady under my care derived relief from constantly wearing a gum-elastic catheter of a large size; through which she injected her food and medicines. As she had lost her upper incisor teeth, the instrument was allowed to project just in front of the lips, where it caused little or no inconvenience. While passing any instrument great caution ought to be exercised; for in one instance it is said that an eminent surgeon forced a tube through the stricture into the thoracic cavity, and then injected half a pint of beef tea into the pleura. Moreover, if it be necessary to employ force the superior laryngeal branch of the pneumogastric may be injured, severe pneumonia being set up from reflex irritation. In one or two instances at least, death has resulted from the severity of the inflammation thus originated.

With regard to almost hopeless examples, two or three suggestions can be made. Thus, it may very properly be a question whether the constriction might not be overcome by the judicious use of potassa fusa, as employed by Mr. Wade for curing stricture of the urethra. This proceeding not appearing feasible, it would have to be determined whether the œsophagus itself could not be opened below the contraction by a cautious dissection (œsophagotomy or pharyngotomy) at the side of the neck. Such an operation has been resorted to successfully for the removal of foreign bodies—coins, fragments of bone, plates of false teeth, &c. The only reported case with which I am acquainted where the gullet has been opened for the relief of stricture so as to allow of the introduction of food into the stomach was in a man with obstruction from tuberculous deposit. The operation was performed by Dr. John Watson, surgeon to the New York Hospital, on the 12th February, 1844, and the patient lived in comparative comfort until the 14th May.*

But there are cases where the stricture is situated too low down to be reached by incisions at the side of the neck. Often the contraction is at that part of the œsophagus where the tube passes through the diaphragm. It will then become a question whether an incision ought to be made into the stomach, large enough to enable us to introduce food? A reply in the affirmative has been returned more than once. In one instance of malignant stricture of the œsophagus gastrotomy has been actually performed, the patient dying forty-five hours afterwards. I think there has also been a second unfavourable instance. Considering the immediate risk of opening the stomach, and the certainty of only at the best being able to postpone for a short time a painful death, I should feel averse to sanctioning such an operation in a case of cancer. It would, however, be a different matter in an instance of incurable simple stricture; for the well-known case of Alexis St. Martin (not to mention some five or six others where the stomach has been opened to remove knives which have been swallowed accidentally or purposely) seems to show that such treatment might be successful. I am inclined to recommend, however, that instead of making a communication between the stomach and external surface with the knife, a strong caustic—*e.g.*, potassa fusa—should be employed; through the agency of which we could gradually excite inflammation, adhesion, and ulceration. The feasibility of such a proceeding seems to be proved by a case recorded by Dr. Murchison.† In this instance, a woman produced a large opening through the abdominal parietes and gastric walls by means of long-continued pressure with a penny-piece. The ulcerative process was completed, so that food escaped from the stomach, on the 2nd March, 1854; yet the patient was in tolerable health, with the fistula large enough to admit three fingers, in June, 1858.

The œsophagus may, like the urethra and bronchial tubes, suffer from *spasmodic stricture.* Young hysterical women are often affected with it; the principal symptoms consisting of difficulty in swallowing, an occasional sense of fulness and choking, languor, anæmia, &c. Spasmodic cannot be confounded with organic or permanent stricture, because the dysphagia is only temporary, a bougie passes with very little or no difficulty, and the symptoms are aggravated when the patient's attention is directed to them. Moreover, it may generally be readily relieved by antispasmodics (F. 86, 89); or by some tonic like the valeriante of quinine (F. 93); or by the phosphate of zinc (F. 414). The daily use of the cold shower bath is serviceable. Any general or uterine disorder which may be present, ought also to be cured.

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* *American Journal of the Medical Sciences*, vol. xxxiv. p. 309. Philadelphia, 1844.

† *Medico-Chirurgical Transactions*, vol. xli. p. 14. London, 1858.

A curious nervous condition termed *œsophagism* is closely allied to the foregoing. It arises thus:—A woman puts some five or six pins into her mouth, has her attention drawn off for a moment, and then erroneously believes that she has swallowed one. Or a nervous individual, perhaps while eating fish, is suddenly spoken to. He is startled, makes a gulp, and fancies he has swallowed a small bone which is sticking in the gullet. As the irritation increases, he seeks advice. But the medical man may be misled by trusting to the patient's symptoms; or feeling, with the fingers in the throat, the upper edge of the cornu of the os hyoides, he is apt to mistake it for a foreign body. A careful investigation with the finger or the laryngoscopic mirror, or the cautious passage of a full-sized bougie, should prevent any error in diagnosis. The nervous sensation may, however, produce dysphagia, and will perhaps continue for weeks. A full dose of opium at bedtime has sufficed to stop it. Quinine, valerianate of zinc, and galvanism are the remedies to employ in obstinate cases. The way in which this error was overcome in former days is shown in the *Essaies* of old Montaigne, first published in 1603.* He says,—"A woman fancying she had swallowed a pin in a piece of bread, complained of an intolerable pain in her throat, where she thought she felt it stick; but an ingenious fellow that was brought to her, seeing no outward tumour nor alteration, supposing it only to be a fancy taken at some crust of bread that had pricked her as it went down, caused her to vomit, and unseen threw a crooked pin into the bason, which the woman no sooner saw, but believing she had cast it up, she presently found herself eased of her pain."

DISEASES OF THE STOMACH.

V. DYSPEPSIA.

Dyspepsia [Δυς = difficulty + πέπτω = to digest], or Indigestion [*In* = neg. + *digero* = to concoct or digest], is one of the most common diseases we have to treat. Anything which interferes with the healthy action of the stomach and intestines may give rise to it.

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* *The Works of Montaigne.* Edited by W. Hazlitt. Third edition, p. 38. London, 1853.

Pathology.—There is a *gastric* and an *intestinal* digestion. The first occupies on an average from two to three hours; and it essentially consists of an exposure of the food to the solvent powers of the gastric juice. This fluid is composed of water holding in solution hydrochloric and perhaps lactic acid, most of the salts which are found in the liquor sanguinis, and an albuminous matter absolutely necessary to the solvent powers of the juice, named "pepsine," or "ferment substance." Moreover, it is always diluted with saliva: sometimes there is an admixture of bile. The proper admixture of the gastric juice with the food is secured by peristaltic movements of the stomach which travel from the cardiac to the pyloric extremity. The object of the gastric juice is to render soluble the albumen, fibrin, casein, &c. (the albuminoid matters), submitted to the stomach; and this it effects by a so-called catalytic action, converting them into a new organic and non-coagulable substance, which has been called "peptone." Of the peptones part are probably at once absorbed, and mingle with the blood; while the remainder, with the fatty substances of the food, pass onwards into the duodenum, &c., to be acted upon by the biliary, pancreatic, and intestinal secretions. The conversion of starch into sugar is commenced in the mouth, by the power of the secretion of the several salivary glands; but whether it is completed in the stomach, or whether its conversion there is delayed to be again renewed in the duodenum, is uncertain. Whatever then disturbs the normal relation between the food and the digestive fluid will affect the digestion and cause dyspepsia, as for instance, food in undue quantity or bad in quality; deficiency in the amount of gastric juice secreted, or departures from its normal character, whether these arise from alterations in the blood, or from local or general want of vigour, or from derangements caused by nervous influence. Or again, weak or irregular action of the muscular coat of the stomach may prevent the proper admixture of the food with the digestive fluid. When digestion is retarded, from whatever cause, the food undergoes decomposition, acetous fermentation occurs, with the formation of acids and evolution of gas, which are the source of most of the discomfort attending dyspepsia. Sometimes in dyspepsia the walls of the stomach are found to be thin, and there is degeneration of the stomach tubes, but usually there is no appreciable structural change.

According to M. Lucien Corvisart the pancreas, together with Brunner's glands, is to be regarded as a supplementary organ to the stomach: so that those matters which escape gastric digestion become quickly acted upon in the duodenum by the pancreatic juice. Its chief use, however, is to emulsify the fatty constituents of the food and prepare them for absorption by the lacteals. The quantity of the pancreatic juice secreted in the twenty-four hours has been differently estimated at seven or eight ounces, and at ten to fifteen ounces avoirdupois; but though it is so much less than the gastric juice (which according to Dr. Draper amounts to seventy ounces, and according to other experimenters from six to ten or even fifteen pints), yet its fermentive matter is said to be ten times more effective. It of course follows from this, that we have a duodenal dyspepsia caused by vitiation of the pancreatic juice, just as we may have gastric dyspepsia.

Causes.—The most frequent causes of dyspepsia are the use of food in too large a quantity, and of an improper nature, or badly cooked; or the consumption of it at irregular times; or the imperfect mastication of it from carelessness, or hurry, or owing to the pain of bad teeth, &c. Dr. Beaumont clearly proved, in his well-known experiments on Alexis St. Martin, that spirituous liquors were most injurious to the stomach; whence persons in the habit of using them often suffer from indigestion. The drinking of too much fluid of any kind at a meal must be mischievous by over-diluting the gastric juice. Another cause of indigestion is an error frequently committed, of not allowing a sufficient interval between the meals to permit of the stomach doing its work and resting: the rule that five or six hours should intervene between each meal, cannot be long broken with impunity. Want of bodily exercise, excessive labour, eating while in a state of exhaustion from exertion of any kind, or work or hurried walking immediately after meals, inordinate intellectual exertion, mental anxiety, general debility, the constant use of narcotic drugs, immoderate smoking, and snuff-taking are fruitful sources of this affection; while of course disease of the mucous membrane or of the muscular coat of the stomach, and derangement of the liver or pancreas, will also give rise to it. So likewise morbid states of the brain, lung, liver, or uterus may, by reflex action, produce functional gastric disorder, attended with most troublesome vomiting. Again, where the blood is rendered impure from any morbid poison in the system, as that of fever, cholera, pyæmia, &c., we find the functions of the stomach destroyed; while this organ will retain nothing in advanced Bright's disease, when the blood is contaminated with retained urea owing to the imperfect action of the kidneys.

The nervous irritability of many literary and scientific men has its origin in dyspepsia. Sedentary pursuits with over-mental labour cause disorders which speak by the stomach in the first instance. The truth is, unfortunately, that one man may injure his constitution by excessive devotion to good work, almost as readily as another may do so by dissipation. It would be well if Bacon's suggestion could be acted up to,—" that we make application of our knowledge to give ourselves repose and contentment, and not distaste or repining." But in these days, hard labour and scant repose are the conditions under which those who aspire to teach their fellow men must be content to live.

Symptoms.—The symptoms of that functional derangement of the stomach which is commonly known as indigestion, vary very much in nature and severity; one individual suffering severely when his dinner "disagrees" with him, while another has merely slight depression. But in the chronic cases for which advice is sought, there will usually be, in a greater or less degree, anorexia or loss of appetite; a sensation of pain, weight, and fulness at the epigastrium; flatulence, or the undue formation and collection of gas in the intestinal canal; costiveness alternating with diarrhœa, acidity, furred tongue, and foulness of the breath, nausea and vomiting; palpitation of the heart; a weak pulse, and a sense of oppression about the chest; pain around the loins, and aching of the limbs; with dull headache, vertigo, neuralgia, an inability for exertion, and hypochondriasis. Occasionally the patient complains of *gastralgia* [Γαστὴρ = the stomach + ἄλγος = pain] or *heartburn*; of *gastrodynia* [Γαστὴρ + ὀδυνή = anguish] or *cramp in the stomach*; or of *pyrosis* [Πυρόω = to set on fire] or *water-brash*, which consists in the frequent eructation of a thin and watery and acid or tasteless fluid. Pyrosis occurs more frequently in women than men; it is not uncommon in advanced life; and it often exists in connexion with some derangement of the nervous or uterine system, or with organic disease of the stomach or pancreas or liver.

The consequences of *slow digestion* from a scanty secretion of the gastric juice, are—feelings of fulness and distension in the left hypochondrium, as well as at the pit of the stomach, after taking food; flatulence, sour fetid eructations, constipation, a coated tongue, and loss of appetite; palpitation of the heart, irregularity of the pulse, headache, and occasionally dimness of vision; with distressing mental depression. When the stomach becomes greatly distended by gas, oppression of the breathing is often produced; owing to the descent of the diaphragm being impeded. The low spirits induced by gastric irritation may vary from slight dejection and ill-humour to the most extreme melancholy; the latter sometimes inducing even a disposition to suicide. The patient misconceives every act of friendship, he is irritable with those who desire to serve him, while he exaggerates slight ailments into heavy grievances.*

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* A humorous sketch of these dyspeptic miseries and their consequences, which may claim attention by the way, was drawn by Sydney Smith in his customary shrewd manner. He says,—"Happiness is not impossible without health, but it is of very difficult attainment. I do not mean by health merely an absence of dangerous complaints, but that the body should be in perfect tune—full of vigour and alacrity. The longer I live the more I am

Sometimes pain and vomiting are more than usually prominent as symptoms, when the dyspepsia will be found to have a nervous origin, and will be generally associated with other evidences of undue nervous excitability. Not unfrequently in these cases the pain is relieved by eating, and there may be extraordinary perversion of the appetite, or food usually easily digested may cause more suffering than substances far more irritating and indigestible.

In some cases of nervous gastric disturbance the appetite is exaggerated, while it is hardly appeased by taking food. Digestion may take place easily and naturally, or it may be accompanied with acid eructations and pyrosis. The chief feature of *bulimic dyspepsia* (so termed by Dr. Guipon) is, however, that the desire for food returns almost directly after a good meal. The patients suffer from constant hunger; and unless they eat immediately the desire for food comes on, they get faint and low spirited, and especially complain of a painful sense of sinking about the præcordia. The remedy which I have found most rapidly curative is cod liver oil, pepsine being also given if there be any difficulty in digesting it; but Dr. Guipon states that he has succeeded best with minced raw meat. Charcoal is also useful in checking the acid eructations.

Diagnosis.—The difficulty of diagnosing correctly the various morbid affections of the stomach is by no means slight; since not only are we for the most part ignorant of any direct means for ascertaining the physical conditions of this viscus during life, but the prominent symptoms of many of its different diseases are almost identically the same. Thus the *condition of the tongue* as an aid to diagnosis and prognosis is of importance to the extent of showing the way in which the functions of the stomach and intestines, the pancreas and liver, are being performed, rather than as giving any real information as to the absence or presence

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convinced that the apothecary is of more importance than Seneca; and that half the unhappiness in the world proceeds from little stoppages, from a duct choked up, from food pressing in the wrong place, from a vexed duodenum, or an agitated pylorus.

"The deception, as practised upon human creatures, is curious and entertaining. My friend sups late: he eats some strong soup, then a lobster, then some tart, and he dilutes these esculent varieties with wine. The next day I call upon him. He is going to sell his house in London and to retire into the country. He is alarmed for his eldest daughter's health. His expenses are hourly increasing, and nothing but a timely retreat can save him from ruin. All this is the lobster: and when over-excited nature has had time to manage this testaceous incumbrance, the daughter recovers, the finances are in good order, and every rural idea effectually excluded from the mind.

"In the same manner old friendships are destroyed by toasted cheese, and hard salted meat has led to suicide. Unpleasant feelings of the body produce corresponding sensations in the mind, and a great scene of wretchedness is sketched out by a morsel of indigestible and misguided food. Of such infinite consequence to happiness is it to study the body."—*A Memoir of the Reverend Sydney Smith.* By Lady Holland. Vol. i. p. 125. London, 1855.

of organic disease. When this organ is habitually clean and moist, neither too florid nor yet too pale, of natural size, and not so flaccid as to be indented by the teeth,—under these circumstances it may safely be inferred that there is no dyspepsia. When, on the contrary, there is irritation or inflammation of the mouth or fauces, or of any portion of the gastro-intestinal tract; when the tonsils are inflamed, when the cavities of carious teeth are allowed to retain decaying food, or when digestion is imperfectly performed,—then the tongue puts on an unhealthy appearance. Speaking generally, the dorsum of this organ gets furred; a condition produced by an increased formation of epithelium, the scales of which (perhaps in a state of fatty degeneration) become mixed with buccal mucus and confervæ and remnants of food. Thus matted together, a more or less dense fur is constituted, which varies in colour according to the substances taken into the mouth, and which may peel off or be scraped away in dense flakes. As a rule, the appearances of the unhealthy tongue alter according to the amount of this fur, the state of the papillæ, the colour, and the moisture. Thus, the whole surface may be thickly furred; or through this fur there are seen protruding elongated and florid papillæ; or there will be a thick fur at the base, with excessive redness of the tip and sides; or with more or less fur, there are cracks and perhaps little ulcerations; or the whole organ is found rather swollen, pale, flabby, and indented at the edges by the teeth. During fevers and inflammations generally, in cerebral and pulmonary disorders, and in fact throughout the progress of most diseases, the tongue is furred or otherwise disordered; but whether the unnatural appearances are directly due to the disease itself, or arise indirectly in consequence of the influence of this on the gastro-intestinal mucous membrane is a dubious point. The probability of the latter view being correct is strengthened by our knowledge that the epithelium of the stomach tubes in scarlet fever is affected, just as this structure is rapidly produced and exfoliated on the tongue. So again, the thin metallic-looking fur which gives the tongue a silvery hue when arsenic has been taken for some time, only forms when this metal is producing dyspepsia.

In the second place, we find *pain and soreness at the epigastrium* not only common to most of the organic affections of the stomach—as to cancer, simple ulcer, and inflammation of the mucous membrane and deeper structures; but also to many of the merely functional derangements, being generally present in the sympathetic vomiting of phthisis and in that of several diseases of distant organs. The diagnosis may, however, be assisted by remembering that when the pain depends upon organic disease, it is generally most severe soon after taking a meal, sometimes even of very small quantities of food, but especially if heavy and indigestible; while when it is due to functional disorder only it usually comes on later when fermentation with the production of acid and gases have taken place, while sometimes it is relieved by food. This last fact has been explained on the supposition that the uneasiness is mainly owing to an unhealthy condition of the gastric secretions, which of course act the less violently the more they are diluted. In ulcer of the stomach, pain is usually constantly present, being considerably aggravated by food; in cancer, it is of a dull aching character, is most acute after meals, and often continues severe while the stomach is full; while the pain of simple indigestion (the remorse of a guilty stomach, as it has been facetiously called) only requires abstinence for its complete alleviation. Tenderness on pressure at the epigastrium can usually be elicited in ulcer, cancer, and inflammatory affections of the stomach, while it is generally absent in simple dyspepsia. A caution is not altogether uncalled for to prevent any aching in the recti muscles of the abdominal wall from being mistaken for gastric pain.

Another important symptom, namely *vomiting*, will be produced by a greater number of circumstances than those which give rise to pain. For example, sickness can be caused by the ingestion of too much food, or of food of a character unsuitable for the patient, or by the simple accumulation of food in the stomach; by organic disease of any portion of the alimentary canal, particularly of the stomach or duodenum or cæcum; by mechanical obstruction of any part of the intestinal tract; by irritation in distant organs, as the brain, uterus, kidneys, &c.; and by morbid states of the blood. When the sickness is due to organic disease, it generally coexists with pain; and it may be diminished by eating very light food, by taking but little at a time, by counter-irritation to the epigastrium, and often by bismuth and ice and sedatives. In the vomiting from mechanical obstruction of the alimentary canal, we learn much by noting the time of its occurrence, the nature of the vomited matters, as well as the extent and urgency of the general symptoms. Thus in stricture of the pylorus, the vomiting only takes place when the stomach is full and distended; so that the matters brought up are large in quantity, while they frequently have a yeasty appearance and consistence. When the constriction is in the small or large intestines, the contents of the bowel are returned into the stomach (by a process hereafter to be described) and then rejected. In cerebral vomiting it is rare to find pain or tenderness about the epigastrium, or nausea, and it occurs independently of the ingestion of food; while the tongue is clean, the bowels are confined, there is severe headache, and other nervous phenomena are manifested. With the sickness from hepatic derangement, or in that caused by an unhealthy state of the blood, there is usually a constant and very depressing feeling of nausea, a thickly furred tongue, with headache but no other pain: flatulence is also often complained of, and there is commonly disordered action of the bowels.

This leads me to speak of a fourth general symptom of the functional and organic diseases of the stomach, which is often very annoying, and not always easily relieved—viz., *flatulence*, or the undue collection of gas in the intestinal canal. It may arise from one or more of two or three causes, that is to say, from air swallowed, from gas generated by decomposition of the contents of the stomach or bowels, or possibly from gas secreted by the mucous membrane of the intestinal canal. In the first instance, the air is thrown up by eructation, and is nearly odourless and tasteless; in the second, the gases are passed upwards or downwards, are very fetid, and often accompanied by nausea, griping sensations, borborygmi, tenesmus, &c.; while in the third case, which is rare except in hysteria (if it ever really occurs, which is doubtful), the gas is generally expelled *per anum*, and has the odour of healthy fæces.

The subject of hæmorrhage in connexion with disease of the stomach will be treated of later. Pyrosis or water-brash, heartburn, acidity, distaste for all kinds of food, oppression about the epigastrium, voracious or depraved appetite, sick-headache, &c., are all symptoms of different varieties of dyspepsia, dependent upon various causes, and requiring special treatment.

Treatment.—Abernethy used to say that no person could be persuaded to pay due attention to his digestive organs until death, or the dread of death, was staring him in the face. This no doubt is true of some men, whose love of good cheer seems to increase with the weakness of their stomachs; and who consequently may be said to suffer from a perpetual indigestion. Nevertheless, when advice is at length sought, the invalid is importunate for speedy relief. It is therefore a happy circumstance, that of all the organs of the body the stomach is that on which we can exert the most powerful action, both indirectly and directly. Daily observation has taught us all how thoroughly digestion is improved by those means which invigorate the system generally; as by rest and early hours, relaxation from severe studies or from the harassing cares and anxieties of business, one day's holiday in every seven, change of air, sea bathing, cold or tepid sponging, horse exercise, the disuse of tobacco and of alcoholic stimulants where these have been too freely indulged in, and so on.

The *regulation of the diet* alone will often effect a cure; while in no case need we expect to give any relief unless we can persuade the dyspeptic to pay attention to the quantity and nature of his food. Supposing that the physician has to deal with a severe case, it is fortunate that he can give the stomach a complete rest for twelve or twenty-four hours; or even for a longer time by resorting to nutrient enemata. This fast being completed merely the plainest food should be allowed, and only small quantities ought to be taken at a meal: asses' milk, cow's milk and lime water, gruel, sago, arrowroot, mutton or chicken broth, and beef tea or

Liebig's extract of meat, will all be useful. As we find these articles can be assimilated without causing any pain or uneasiness, we may increase the diet; and white fish (especially whiting, sole, or turbot), poultry, venison, pheasant, rabbit, or mutton can be ordered. Stale, or unfermented, or aërated* bread may be eaten; but vegetables (with the exception of cauliflower, asparagus, spinach, and vegetable marrow), raw fruit (save grapes, strawberries and oranges), cheese, every kind of beer, port wine, and undiluted spirits should be strictly forbidden. Pastry and confectionery are seldom admissible: "things sweet to taste, prove in digestion sour." If any stimulant be needed, a little dry sherry or pale brandy and water will prove the least injurious, and in some instances may even be beneficial. Simple aërated water—water charged with carbonic acid gas—is often very grateful to an irritable stomach; or soda water (that which really contains a few grains of soda) can be recommended. Coffee (not chicory) taken upon an empty stomach occasionally acts as a valuable stimulant; but swallowed soon after a meal it merely serves to hinder digestion, and to make a simple dinner disagree. Then the dyspeptic should be careful to masticate his food thoroughly, so that the digestive fluids may quickly liquefy and transform it. And lastly, he ought to try and encourage an indolent sense of contentment for some little time after eating, so as not to divert from the stomach the nervous force required for the due performance of its functions; since it must in the end happen that "unquiet meals make ill digestions." For this reason it is better that busy men dine towards the close of day, when the hurry and turmoil of active life are relaxed.

After recovery from the urgent symptoms attention will still be needed to prevent any relapse. While supervising the diet scale, however, it must be remembered that too much simplicity is bad. For not only does man absolutely require a mixed food, but that which is eaten with relish is better digested than that taken with indifference or disgust. As typical of many cases met with in practice, we may imagine the following:—A gentleman between thirty and fifty-five years of age, engaged for six or eight hours daily in his office or warehouse, with an irritable, revengeful stomach and no great amount of vital power, not only wishes to be well, but what is rather more unusual is willing to take the necessary steps to secure health. To enable him to accomplish his purpose, he may be recommended to adopt for several months, some such diet-table as this:—

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* This bread, made by the process of Dr. Dauglish, is clean and pure, and produced entirely from wheaten flour of the best qualities. It is mixed by machinery, and is untouched by the hand. Being formed without ferment or leaven (carbonic acid gas is substituted for yeast), it relieves flatulence instead of promoting it; and as it is more easily digested and more nourishing than common household bread, so it is more economical.

7.0 A.M.—A tumblerful of equal parts of milk and soda water, or of milk and lime water.

7.30 A.M.—To rise from bed. Use a tepid or cold sponge bath: rub the skin thoroughly with a coarse towel. Dress leisurely.

8.30 A.M.—Breakfast. A large cup of weak tea with half milk, or milk and water. Sole or whiting; or the lean of an underdone mutton chop; or a new-laid egg lightly boiled. Stale bread and a little fresh butter. Watercresses now and then, if they do not cause eructations.

1.0 P.M.—Luncheon. Oysters (conditionally that they agree); or an underdone mutton chop, or a slice out of a roast leg of mutton, when meat has not been taken for breakfast. A biscuit, or stale bread. One glass of sherry (Manzanilla or Amontillado). Or, if there be little or no appetite, a raw egg beaten up in sherry and water, and taken with a small biscuit, will be useful.

6.0 P.M.—Dinner. Cod-fish, sole, whiting, smelts, turbot, or brill. Mutton, venison, chicken, grouse, partridge, hare, pheasant, tripe boiled in milk, sweetbread, boiled leg of lamb, or roast beef. Stale bread. Cauliflower, asparagus, vegetable marrow, French beans, floury potato, or sea-kale. Half a wineglassful of cognac in a bottle of soda water. Two glasses of good dry sherry or of claret after dinner. A few grapes, an orange, a baked apple, or perhaps strawberries may be taken, if desired. A dose of pepsine, where needed. Where there is constipation, an excellent pill for daily use can be made with four grains of pig's pepsine and half a grain or rather more of the extract of Barbadoes aloes.

9.0 P.M.—A small glass of cold brandy and water, with a biscuit; or a cup of weak tea with half milk, and a slice of bread and butter; or a teacupful of milk-arrowroot.

11.0 P.M.—Bed. To sleep on a mattress, without too much covering. A wet compress (F. 136) over the epigastrium is of assistance. The room is to be properly ventilated. A fire will be very beneficial in cold weather. It is presumed that a good night's rest has been earned by a fair amount of exercise in the open air.

The foregoing table may of course have to be modified according to the season, though generally it will be found sufficiently suggestive. The attempt to give variety, however, is not to be overlooked. There is only a partial truth in the caution of Socrates,—"Beware of such food as persuades a man, though he be not hungry, to eat; and those liquors that will prevail with a man to drink them, when he is not thirsty."*

Under the head of *medicines* in the treatment of dyspepsia, several can be referred to as having serviceable properties. Perhaps the first which ought to be mentioned is pepsine, the digestive principle of the gastric juice; generally valuable when there is an imperfect performance of the functions of the stomach, and especially where this is indicated by pain or other disturbance following the use of animal food. It should be given in doses proportioned to the necessity of the case, with the two chief meals of the day. In some instances an advantage seems to be gained by the simultaneous use of a small quantity of the dilute hydrochloric acid. Where the pepsine alone fails to relieve the annoyance of indigestion, about the one-seventh of a grain of the hydrochlorate of morphia should be combined with each dose; or when great atony prevails, the one-twenty-fourth of a grain of strychnia, or five minims of the tincture of nux vomica, may be employed in the same way (F. 420). There are also other agents which increase the gastric secretions, such as the nitro-hydrochloric acid, rhubarb, ipecacuanha, and ginger; the first being often especially useful, when given in small doses well diluted (F. 378). If we wish to restrain undue secretion, as manifested by pyrosis, we resort to moderate doses of the aromatic sulphuric acid, bismuth, nitrate of silver, conium, belladonna, the compound kino powder or hydrocyanic acid; if to relieve pain and vomiting we can use ice, morphia, and carbonic acid—by means of effervescing draughts; while if there be an excessive formation of acid we order alkalies. Supposing that an acute attack of gastrodynia is caused by the stomach being loaded with unhealthy acid secretions, we must endeavour to give relief by producing vomiting. For this purpose the free administration of warm water will usually suffice; or if it fail, a teaspoonful of mustard in a tumblerful of water will make the stomach eject its contents. Afterwards one or two doses of a mixture containing soda, morphia, and hydrocyanic acid (F. 70) can be advantageously ordered. Alkalies are not to be persistently given, however, because there is a greater secretion of gastric acid than is proper; since they will only tend to keep up the mischief by stimulating the mucous membrane of the stomach to still greater secretion, so that there will remain a surplus of free acid over the amount neutralized. When there is a feeble digestion with no great gastric irritability, one or other of the vegetable tonics will often prove invaluable, and recourse may be had either to gentian, calumba, quassia, or bark. Salicin (F. 388) is especially worth trying in many instances, often agreeing well where quinine cannot be tolerated. If aperients are needed only those of a mild nature ought to be prescribed; such as grey powder and the compound rhubarb pill (F. 171), taraxacum and nitric acid and senna (F. 147), ipecacuanha and rhubarb (F. 165, 179), magnesia (F. 169), or simple enemata (F. 188), &c. Finally, to make the cure complete, and to prevent a relapse as far as drugs will do so, mild preparations of steel (F. 401, 403, 408) are to be ordered;

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* Some cynic indeed has said, in opposition to this text, that one of the great privileges of the human species over other animals is the being able to eat without feeling hungry, and to drink without being thirsty.

while it may be noted that frequently I have found benefit from combining pepsine with the reduced iron (F. 394). Where there is any suspicion that the digestion is still torpid from want of tone, few remedies will prove of greater service than quinine and ipecacuanha (F. 384).

When nervous symptoms are prominent and there is no evidence of gastric irritation, arsenic or phosphorus may be most useful. Sulphate or oxide of zinc (gr. ij) is sometimes of service when the dyspepsia is traceable to anxiety or exhaustion, or to indulgence in alcohol.

With regard to the use of wine and well-diluted spirits to *prevent* dyspepsia, it must be granted that they are often very beneficial; provided that they be taken in strict moderation, and only at mealtimes. It is no doubt true that the stomach which requires stimulants to enable it to act efficiently, can hardly be said to be in a healthy state. But at the same time we should remember, that the battle of life is not waged without much wear and tear, without almost overwhelming anxieties and sickening disappointments; and that the digestive organs are the first to sympathize with the depressions of the mind, no less than with the fatigues of the body. Hence the precept furnished by St. Paul to Timothy may well be adopted generally,—"Drink no longer water, but use a little wine for thy stomach's sake and thine often infirmities."

VI. GASTRITIS.

Under the head of Gastritis [Γαστὴρ = the stomach; terminal *-itis*] several important affections of the stomach, more or less closely connected with the inflammatory process, have to be considered. The well-directed labours of many eminent physicians, both abroad and at home, during the past few years, have done much to improve our knowledge of these obscure but highly important diseases.

1. ACUTE GASTRITIS.

Acute inflammation of the mucous membrane of the stomach is a disease which in all probability never arises idiopathically. It is, however, a frequent result of poisoning by any of the irritants —as by the mineral acids, caustic alkalies, arsenic, &c.; and it sometimes occurs from swallowing boiling water, or large quantities of irritating emetics when they fail to produce vomiting, or excessive doses of tartar emetic.

Symptoms.—In gastritis produced by irritant poisoning we shall generally find an increasing burning pain in the epigastrium, aggravated by the slightest pressure; constant distressing nausea, soon followed by violent retchings; an accelerated pulse, with more or less difficulty of breathing; and great thirst, with an unremitting desire for cold drinks which are vomited as soon as taken. Very shortly there sets in extreme prostration; denoted particularly by faintness, feebleness and great frequency of the pulse, marked pallor, cold clammy extremities, and intense anxiety of countenance. When the inflammation continues, the tongue becomes red and glazed and smooth, unless it has been injured by the action of the poison; the bowels are constipated; the urine is scanty and high coloured; there is great restlessness and hiccup; while the prostration increases, till death takes place from exhaustion. These symptoms are not present in all cases; the immediate effects of severe injury to the stomach being sometimes comparatively slight. When the Eddystone Lighthouse was destroyed by fire in 1755, one of the keepers happened to be burnt by the fall of the molten lead. The man asserted that some of the metal had passed down his throat; but as he had gone through much fatigue after the accident, and had begun to amend at the sixth day, his statement was not credited. However, on the eleventh day he rapidly grew worse and died; when, on examining the body, a piece of lead weighing more than seven ounces was removed from the stomach.

Morbid Anatomy.—The morbid appearances usually found are patches of intense dark redness, hæmorrhages and erosions, especially upon the rugæ, softening, sloughing, and sometimes (when one of the powerful escharotics has been taken) perforation. Redness alone is by no means evidence of the previous existence of inflammation, since it may be produced after death by gravitation of the blood to the most dependent parts: where death occurs, too, from any cause during the process of digestion the stomach is sometimes found stained intensely red. So also with regard to softening and perforation, we must remember that these may occur from the post-mortem action of the gastric juice —from the stomach actually digesting its own tissues, a fact which was first pointed out by John Hunter.

Few subjects in pathology are more interesting than this one of *Cadaveric softening of the Stomach.* It is a condition not uncommonly found when death has occurred suddenly from an accident soon after a meal, and when the body has been kept in a warm situation. The most frequent site of the softening is the fundus and cardiac end of the viscus; and it is perhaps most often met with in young subjects, and after death from phthisis, or severe cerebral disease giving rise to great exhaustion. It is distinguished from ulceration or inflammatory softening or perforation by absence of thickening and by greater transparency, by the irregular form and ragged softened edges of the aperture if perforation have occurred, and by the absence of inflammatory changes in surrounding parts reached by the extravasated contents of the stomach. Some interesting experiments have been made by Bernard, Harley, Pavy, and others, upon this power of the gastric juice. Through a fistulous opening in the stomach of a dog, Dr. Pavy introduced, during the process of digestion, the hind leg of a living frog and the ear of a live rabbit. In both cases the parts underwent digestion after two or three hours. Hence Dr. Pavy argues, that the capability of resisting their own digestive powers possessed by the walls of the stomach during life, and which ceases with death, is not due, as Hunter thought, to the vital force with which they are endowed. If, then, this reputed influence of the "living principle" have no foundation, what view can be substituted? Recourse has been had to the theory that the immunity to destruction which the stomach enjoys during life is due to its epithelial lining. For, it is said, while digestion is going on the gastric epithelium and mucus are constantly being dissolved, but then they are as constantly being reproduced. After death the gastric juice still acts upon the epithelium, when as no new layers are formed the deeper coats suffer. Dr. Pavy has found, however, on submitting this view to the test of experiment that it completely fails; inasmuch as he removed a considerable-sized patch of mucous membrane, and yet food was afterwards digested without the slightest sign of any attack being made on the deeper coats of the stomach. The question therefore remains unanswered up to this point. And now Dr. Pavy has another suggestion,—*i.e.*, that the protection is to be referred to the circulation within the walls of the organ of an alkaline current of blood. His argument is that the presence of acidity is necessary for the accomplishment of gastric digestion: alkalinity is a constant character of the blood: during life the walls of the stomach are everywhere permeated by a current of this alkaline blood: hence here we find an opposing influence, the effect of which is to destroy, by neutralizing its acidity, the solvent properties of the digestive fluid tending to act upon the texture of the organ. The blood being stagnant after death, the opposing influence is lost. Should life happen to close during digestion, there is only the neutralizing power of the blood actually in the vessels of the stomach, to impede the progress of attack upon the organ itself; and the consequence is, that erosion of its parietes proceeds, so long as the temperature remains favourable for the process, and the solvent power of the digestive liquid is unexhausted. The apparent contradiction to this hypothesis which is offered in the fact of the living frog's legs and the rabbit's ears being digested, is said to be a question of degree of power between two opposing influences. The very active circulation through the stomach suffices to protect its walls; while the comparatively exsanguine ears of the rabbit and legs of the frog suffer.

Treatment.—The treatment of acute gastritis will in a great measure be the same, whatever may be its cause. In most cases

I should rely on opium, and the sucking of ice—which will frequently relieve the vomiting, as well as lessen the inflammation. Perhaps, at the same time, it might not be injudicious to allow small quantities of barley water, milk or cream, cold arrowroot, or gruel. As a rule, however, it will be much better to nourish the patient by nutritious enemata (F. 21, 22, 23) than by food administered through the mouth. In some instances fomentations applied to the epigastrium give much relief; while in others a bladder of ice has proved more soothing. When any of the corrosive poisons have been taken, emetics will very rarely be necessary, since the destructive agents themselves induce severe vomiting: the stomach-pump should never be used. During convalescence great care will be required in regulating the diet; farinaceous substances and broths being chiefly allowed, while these ought only to be given in small quantities at a time.

2. SUBACUTE GASTRITIS, or GASTRIC CATARRH.

This form of inflammation is almost as common as the preceding variety is rare. It is fortunately a mild disorder, unless of long duration; when it may produce thickening and induration of the coats of the stomach, narrowing of the pylorus, or even ulceration perhaps going on to perforation.

The *causes* are numerous. There is no doubt that it may be brought on by excess in eating or drinking or by indigestible foods. Dr. Beaumont frequently witnessed this result in Alexis St. Martin; who, in consequence of a gunshot wound, had a permanent fistulous opening through the abdominal parietes into the stomach, thus affording an opportunity for watching the process of digestion. Under the continued use of improper food, the inflammation always became aggravated; whereas under the influence of low diet and cooling drinks the stomach rapidly recovered. Acute or chronic alcoholism is one of its most common sources; and so is the use of beer, especially when this is drunk at odd times during the day. On the other hand, long-continued abstinence is a cause of this form of gastritis; as has been proved in experiments upon dogs and other animals when deprived of food. Sudden changes of temperature, cold water taken freely after great exertion, a powerful emotion soon after eating, may give rise to gastric catarrh. So also this disease sometimes arises during the progress of acute inflammations and febrile diseases, particularly of some of the exanthemata—as scarlatina, cholera, hooping cough, erysipelas, diphtheria, pyæmia, &c.; small quantities of arsenic, in whatever way they may be introduced into the system, will produce it; sometimes the poison of gout in the blood seems to give rise to it; and lastly, it may now and then be due to some narrowing of the pylorus impeding the passage of food into the intestines.

When slight, these disorders are usually spoken of as "bilious attacks," the symptoms being little more than those of simple indigestion, such as a furred tongue, oppression at the epigastrium, constipation, anorexia, vomiting of bile, giddiness, and "sick headache." The habitual sick headache, however, to which many persons, especially women, are subject, though often excited by errors of diet, has its origin in the nervous system. For the treatment of these cases nothing more is necessary than a purgative pill of calomel and rhubarb, or of aloes, at bedtime; followed by a seidlitz powder or bottle of soda water early on the following morning. A meagre diet and plenty of cold water for the succeeding twelve hours will complete the cure. Alcoholic stimulants had better be avoided.

In more severe cases the epigastric uneasiness and oppression is very great, and there may be cramp-like pains and tenderness. There is severe frontal headache with extreme depression of spirits, and sometimes palpitation and faintness. A distressing nausea is felt and the mouth fills with water; usually there is vomiting of food and much acid fluid, or the bowels may be disordered, and diarrhœa, with griping pains, be set up; more commonly there is constipation. The tongue is covered with a thick, moist fur; the breath is offensive; and there is great thirst, with loathing of food. These symptoms may persist for some time if improper treatment is adopted.

Occasionally, especially in children, there is considerable febrile reaction, which may easily be taken for the early stage of enteric fever, and hence attacks are often spoken of as "gastric fevers." In these cases the skin is hot and dry, the pulse is quick and full, there is vomiting with epigastric pain, and scanty urine which is loaded with lithates.

Pathology.—Under the influence of this form of inflammation, Dr. Beaumont noticed, in the case of Alexis St. Martin, that the gastric mucous membrane lost its healthy pale pink colour, and assumed a somewhat livid redness. Red pimples were scattered here and there over it, which later filled with whitish matter; or red patches appeared and sometimes upon these false membranes. Again abrasions were seen and grumous blood exuded from small portions of the mucous membrane; while at one time neither gastric juice nor mucus was secreted, at another there was much ropy mucus having an offensive odour.

After death all redness may have disappeared from contraction of the minute vessels, or from decoloration of the blood by the gastric juice. The mucous membrane will be thickened and opaque, and may have a dead white appearance, or present red points or patches. Under the microscope the gastric tubes are found distended by degenerated epithelium and granular matter, while the intertubular connective tissue is infiltrated. The solitary glands also are enlarged, and there may be erosions.

As regards the *treatment*, attention must be paid to those rules which have been laid down in the remarks on Dyspepsia. In many cases removal of the cause, assisted by low diet and cold water as a drink, will thoroughly cure the disease in a short time.

In all the stomach should have rest, and no solid food should be allowed till the epigastric pain and tenderness have subsided. In a severe attack an absolute fast of twenty-four hours' or longer duration may be required, the patient being allowed to sip cold water, or suck small pieces of ice, but not to drink largely. An emetic of ipecacuanha, followed by copious draughts of warm water taken very early, may cut short an attack. The remedy most generally available is a mercurial purge followed by a saline aperient, and later by effervescing draughts, with hydrocyanic acid to check the sickness. Hot fomentations and sinapisms afford relief, and in rare cases leeches may be of service. When the acute symptoms have subsided, bismuth and mild tonics will be found useful in restoring the tone of the stomach.

In the gastric fever of children a mild aperient (F. 176) repeated one or two evenings, low diet, and effervescing salines will soon bring about a cure.

3. CHRONIC GASTRITIS, or CHRONIC GASTRIC CATARRH.

Chronic catarrh or mucous flux may succeed a bilious attack, or it will occasionally arise as a separate affection. As causes must be mentioned, habitual excess of food or indulgence in improper food—pork, goose, duck, salmon, mushrooms, cucumber, iced creams; the abuse of wine and spirits and beer, including their moderate employment in some conditions and constitutions; an unhealthy state of system, as the presence of scrofula, gout, syphilis, albuminuria, &c.; and the employment of particular medicines, especially copaiba, cubebs, turpentine, &c. Passive congestion of the stomach from obstruction to the return of blood to the heart, as in organic diseases of the heart, lungs, and liver. Extreme congestion of this kind, leading perhaps to severe hæmatemesis, is most frequently due to some cause which prevents the free flow of blood through the liver, as "hobnail" or "gin-drinker's" liver. Gastric catarrh often coexists with chronic bronchitis, phthisis, and emphysema of the lungs. The symptoms vary greatly in different cases and at different times in the same case. Oppression and discomfort after eating, or a feeling of faintness and epigastric pain when the stomach is empty, a craving for food but an inability to take more than a very little when it is supplied, great thirst, offensive breath, a spongy state of the gums, a furred or red tongue, especially at the tip and edges, with enlarged fungiform papillæ. Flatulence, acid eructations, heartburn, pyrosis, constipation, vomiting of glairy fluid on awaking in the morning, weakness, coldness of the extremities, headache, languor, depression of spirits, sleeplessness, palpitation, &c., are often connected with gastric flux, and there is generally evidence of want of nutrition, loss of flesh, and sallow skin.

Pathology.—In chronic gastritis there is usually more evidence of vascularity after death than in acute catarrh, and not uncommonly hæmorrhagic erosions are seen. The mucous membrane is of an ash-grey colour, especially near the pylorus, and thickened, while the basement membrane of the tubes is thickened, and their secreting epithelium in a state of fatty degeneration.

Treatment.—The most useful remedies for restoring the stomach to its natural condition are those which restrain the secretion of mucus; such as the sulphite of soda (F. 48), bismuth (F. 65, 112), perhaps the oxide or nitrate of silver (F. 47, 59), oxalate of cerium (two or three grains in a pill with henbane or gentian every six or eight hours), kino and logwood (F. 108), the officinal infusion of matico, and occasionally the iron alum (F. 116). If there be much constipation, I think a dose of five grains of calomel is one of the best purgatives; the action of the bowels being subsequently kept regular by small doses of aloes at dinner, or by effervescing citrate of magnesia before breakfast, or by Pullna or Friedrichshall water, or compound rhubarb powder. When the affection is traceable to alcoholic liquors opium is often very useful; if to syphilis, mercury will sometimes give a speedy cure. Of course attention must be paid to the diet; and it will usually be better for two or three days to keep the patient almost entirely upon milk rendered alkaline by admixture with lime-water, allowing small quantities at short intervals. Then arrowroot made with milk, bread and milk, and one or two eggs lightly poached, with stale bread and fresh butter, may be permitted; followed after a short time by white fish, poultry, mutton, sherry and water, &c.

4. INDURATION OF THE PYLORUS.

Induration or fibroid infiltration of the pylorus appears to consist of an abnormal development of fibrous tissue in the submucous areolar membrane about the pyloric portion of the stomach. This condition may come about as the result of chronic inflammation; or perhaps it will arise from the healing and contraction of an ulcer, or from repeated irritation caused by the habitual use of raw spirits. The appearance of the diseased structure to the naked eye somewhat resembles scirrhus, so that by some pathologists this disease has been erroneously regarded as malignant; but minutely examined it is found to be composed of tissues resembling those of a simple fibroid tumour, and not to consist of the copious cell-growth characteristic of cancer. The walls of the pylorus are at times only slightly thickened; or they may be converted into fibro-cartilaginous tissue, with such contraction of the opening that ultimately nothing larger than a crowquill can pass. In proportion to the amount of obstruction, there will be found dilatation of the stomach, together with hypertrophy of its muscular coat.

Although the pyloric region is by far the most frequent seat of the fibrous deposit or infiltration, yet the cardiac orifice may also suffer, or even the whole of the viscus can be affected. In the latter case, the necropsy shows a large stomach of an opaque pearly-white appearance, of increased weight and density, of a gristly feel, and having its coats greatly thickened. This condition now and then exists without giving rise to any symptoms of importance, except in cases where there is constriction of the pyloric valve. *Fibroid infiltration* appears to be a good name for it, unless the reader should prefer the designation suggested by Dr. Brinton—cirrhotic inflammation, or plastic linitis.

The symptoms of fibroid infiltration of the pylorus are in some respects like those produced by malignant disease affecting this part. There is emaciation with progressive debility, pyrosis, acid eructations, and constipation. At times there are attacks of hæmatemesis. Although the appetite is commonly ravenous, great moderation is obliged to be practised owing to the severe suffering which a hearty meal induces. Vomiting takes place three or four hours after a meal—especially after dinner; the matters brought up being partly digested, mixed with water, often yeasty-looking, and perhaps containing sarcinæ or torulæ. Ordinarily, except towards the last, the sickness only occurs at intervals of a few days; while if there be much hypertrophy the contents of the stomach are ejected with considerable force. As the patient gradually wastes, so the thickened pyloric tissues can be felt (like a tumour, perhaps the size of a small orange) through the abdominal parietes; the swelling only being really painful when there is any ulceration. By its pressure on the aorta it usually gives rise to troublesome pulsations. After a time the feet and legs get œdematous, the mind is active but dispirited, there is epigastric soreness, the sleep is disturbed, diarrhœa often intervenes, and death ultimately occurs from inanition. In many instances, however, by strict attention to diet, life may be prolonged for several years.

The treatment ought to consist in allowing only simple soft food,—such as milk, cream, raw eggs beaten up in sherry and water, strong beef tea, and soups. Cod liver oil often proves useful during the early stage. At the same time steel and quinine are of service. When there is any temporary exacerbation of the symptoms, the stomach should be rested for a day or two, and nutrient enemata resorted to. The patient had better be warmly clothed; an elastic abdominal belt gives agreeable support; while the gastric irritability can often be relieved by a belladonna plaster.

VII. ULCER OF THE STOMACH.

This is a particularly interesting and not uncommon disease. It is variously spoken of by authors as the *simple, chronic, round,* or *perforating* ulcer of the stomach. The features chiefly presented by it are debility, pain, indigestion, sickness, and hæmatemesis. The ulcer will perhaps cicatrize, and complete recovery ensue. On the contrary, the loss of substance may gradually increase. Life is then terminated by marasmus from want of nourishment; or in a few hours by perforation and consequent acute peritonitis, or by abundant hæmorrhage.

Causes.—The cause of ulcer of the stomach has not as yet been determined. This affection is most frequent in women; while there appears to be some uncertain relation between gastric ulcer and disturbed menstruation—particularly amenorrhœa. Out of 39 histories of cases terminating by perforation, in females, collected by Dr. Edwards Crisp, the state of the uterine functions is only mentioned in 14; in 13 of these the catamenia either having never appeared or being irregular, or being suppressed.

According to Virchow, the first step in the production of the ulceration is the arrest of the circulation through a sufficient depth of the gastric tissues to permit of the destructive power of the acid gastric juice being exerted without the check it naturally receives from the alkaline blood. The circulation is supposed to be arrested from arterial obstruction by embolism; from extravasations owing to obstructions of the portal vein, or to mechanical violence in retching; or to diminished calibre of the vessels, the consequence of some morbid condition of their coats.

Pathology.—A large number of complicated and important points in the pathology of this disease were laboriously investigated by the late Dr. William Brinton; and from his valuable monograph many of the following observations have been selected.* As, however, I have not hesitated to modify these observations where it has seemed necessary to do so, the responsibility for the different statements must not be shifted from my shoulders.—Among the 4000 cases of different diseases which formerly came under Dr. Brinton's care annually at the Royal Free Hospital, he calculated that there were at least 40 examples of ulcer of the stomach. This observation agrees in the main with that of foreign pathologists. It is probable that in the post-mortem room a cicatrix or an unhealed ulcer will be found in from 3·5 to 4 per cent. of the total cases examined.

The ulcer is more frequent in the female than the male, in the proportion of at least two to one. It is specially a disease of middle and advancing life except that it is common in young women, hardly ever occurring before puberty; while it is more frequent in the poor than in the rich, and perhaps amongst needlwomen and domestic servants than other females. The ulcer is rarely smaller than a fourpenny piece, or larger than a crown piece; its shape is usually circular or slightly oval; and the edges are at times sharp as if the tissue had been punched out when the ulcer is recent, and they may be infiltrated with blood; in other instances the margins are thickened and raised, and sloping so that it has a crater-like appearance, all the coats of the stomach being matted together. It is much more frequently found on the posterior surface, the lesser curvature, or the pyloric pouch, than on the anterior surface, the greater curvature, or the cardiac extremity; while two or more ulcers are frequently present in the same stomach. About two-thirds of the instances of this disease undergo what is probably a spontaneous cure, and a cicatrix results which may cause puckering of the surrounding mucous membrane; in exceptional cases the ulcer has been fatal in ten days, generally by perforation; sometimes by exhaustion, caused or hastened by vomiting; and very rarely by hæmorrhage. As regards the majority of fatal instances, a period of several weeks or months precedes death. Perforation, however, is an exceptional occurrence in gastric ulcer: where it occurs, the ulcer has commonly been found on the anterior surface of the stomach. When perforation does take place, the contents of the stomach are generally poured into the abdominal cavity, where they give rise to fatal peritonitis. But in some very few instances the effusion—owing to the presence of adhesions, &c.—is confined to the neighbourhood of the perforated spot; so that circumscribed peritonitis is set up, suppuration takes place, and a kind of chronic abscess is formed. This may prove fatal in many ways, as, *e.g.*, by discharging its contents through the diaphragm into the thorax; or, more fortunately, it will possibly open externally through the abdominal walls. In the latter case a gastric fistula becomes established, which either remains open, like that of Alexis St. Martin, or may gradually close and permit of complete recovery. Dr. Brinton conjectured that of every 100 ulcers of the stomach, 50 may cicatrize, 13½ perforate its walls, 3¼ corrode its large vessels, and 2 or 3 kill by the sheer exhaustion and inanition they involve. There is still a proportion of about 30 ulcers in every 100 left quite unaccounted for; many of which can be fortunately allowed to swell the number of cures, Dr. Brinton's estimate being decidedly too small.

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* *On the Pathology, Symptoms, and Treatment of Ulcer of the Stomach.* London, 1857.

Symptoms.—The symptoms are liable to some variety, and hence the discrepancies which are to be found in the descriptions of different observers. The most constant indication is a wearying burning pain in the back over the lower dorsal vertebræ, and in the epigastrium. With respect to the latter situation, the aching or uneasiness is often referred to a small spot just below the ensiform cartilage, when there is almost always tenderness on pressure; while it is frequently described as dull and sickening, and almost always as being increased by food and especially by hot fluids. Sometimes the pain is associated with violent pulsations, with attacks of syncope, or with convulsions; and in some few young women it has apparently been increased by the access of menstruation. There is occasionally eructation of a sour fluid, and at times nausea with vomiting. The food is rejected unaltered or converted into chyme according to the time it has been retained. The appetite does not usually fail; but the patient feels it can only be gratified at a heavy penalty. The bowels get inactive. The state of the tongue varies and is not characteristic, but it is frequently red and angry-looking. The patient generally loses flesh as well as strength, but otherwise the constitutional symptoms are slight; with this exception, that in young females amenorrhœa is often produced, especially in those cases where there is copious hæmorrhage from the ulcer. After the disease has continued a longer or a shorter period, the patient may sink from exhaustion; or perforation will perhaps occur after a full meal, or in an attack of vomiting; or failing this, there may be a severe attack of hæmorrhage. But in favourable cases the ulcer gradually heals; the pains and sickness and attacks of hæmatemesis diminish; and the patient completely recovers, save in a few exceptional instances where the cicatrization produces contraction of the pylorus, &c.

Supposing perforation to result, with effusion of the contents of the stomach into the peritoneum, the symptoms will be so severe that the nature of the case cannot be mistaken. There is violent pain, beginning in the epigastrium but soon spreading over the whole belly; the abdomen becomes swollen and tympanitic; the patient assumes that position which most relaxes the abdominal muscles; there will probably be complete suppression of urine; and there is great anxiety, with rapidly increasing prostration. Moreover, these indications of the giving way of the coats of the stomach usually occur after a full meal; and perhaps from some sudden exertion, as that produced by vomiting, coughing, sneezing, &c. After an interval, a state of almost painless collapse sets in; and death usually occurs within thirty-six hours from the time of rupture. I have, however, known of immediate dissolution from shock.

Treatment.—In the management of cases of ulcer of the stomach we have chiefly to rest the diseased viscus, to support the system, and to facilitate the cicatrization of the ulcer. When the pain is very severe, hot fomentations, sinapisms, and turpentine stupes applied over the epigastrium, give relief: in obstinate vomiting, or in hæmorrhage, the application of cold (ice and salt in a bladder) is more advisable. Opium can often be administered with very great advantage, either alone in the form of the extract, or combined with henbane, Indian hemp, &c. Bismuth is also a good sedative, and may be given in ten-grain doses, thrice daily, mixed with five or ten grains of compound kino powder. Where there is much flatulent nausea, Dr. Brinton recommended the iodide of potassium in small doses, with the bicarbonate of potash and some bitter infusion. Supposing the vomiting to be very troublesome, I have seen most relief from five minims of the officinal laurel water in half an ounce of iced water; repeating the dose every two or three hours. Effervescing draughts, champagne, soda water, &c., will often check the sickness temporarily, but usually at the expense of aggravating the pain. Where there is but little pain or nausea some mild preparation of steel (F. 398, 401, 403) will prove very valuable; or, if the patient can bear it, quinine and iron (F. 380) may be ordered. Supposing that aperients are needed during the progress of the case, small doses of castor oil will be most efficacious, provided that simple enemata are inapplicable.

Any of the foregoing remedies, however, will be almost worse than useless, unless great attention is paid to the nature of the food and the quantity taken at each meal. At the commencement it will be better merely to allow farinaceous substances—as a little oatmeal or arrowroot—with milk; taking care that only a very small quantity be used at a time. Cold milk, mixed with one-fourth part of lime water to prevent its coagulating in the stomach, can be taken in small quantities at a time, at intervals of two or three hours, to the extent of three or four pints in the twenty-four hours. It is probable that milk thus rendered alkaline is digested in the intestines; so that its administration really rests the stomach. Should even this food be rejected by the stomach, that viscus ought to be allowed a complete rest; nourishment and medicine being administered entirely by enemata (F. 21, 22, 23, 188). Then, as the symptoms decrease, a more strengthening diet will advantageously but cautiously be permitted; until the patient can painlessly digest and enjoy white fish, light puddings, poultry, &c. During the whole progress of the case, tea and coffee, uncooked fruit and sugar, vegetables and pastry, beer and other alcoholic stimulants, should be forbidden; but if the latter be called for by the wants of the system, only a little weak brandy and water ought to be ordered.

With regard to the management of threatened or accomplished perforation all that can be done is to administer full doses of opium for several days; to keep the stomach empty; and to place the patient in such a position that the ulcer may be uppermost, and not where fluids can gravitate to it. And lastly, under all circumstances, after a cure has been effected the patient must be warned that a careful avoidance of errors in diet, of pressure over the epigastrium, as well as of violent exercise, will be necessary for many months. A single excess, several weeks subsequent to recovery, has brought back all the painful symptoms, and again placed the sufferer's life in considerable jeopardy.

VIII. CANCER OF THE STOMACH.

The stomach may suffer from scirrhous, medullary, or colloid cancer; while the affection is generally *primary*. The disease often comes on gradually, the early indications of it being obscure.

Pathology.—A record of 9118 cases of death from cancer, in Paris, from 1830 to 1840, shows that the disease was seated in the uterus in 2906 cases, in the stomach in 2303, and in the breast in 1149. The pyloric aperture is the part most frequently attacked, next the cardiac orifice, and then the space along the smaller curvature. "Sometimes the cancer, at the time of death, is of small extent: but occasionally, and especially in colloid cancer, the disease spreads, until the greater portion, or even the whole of the stomach, is involved."* When the disease causes obstruction or narrowing of the pyloric orifice, the stomach generally becomes greatly dilated. Gastric cancer is possibly slightly more common in men than in women. It is rare before the age of forty: taking the number of persons living into account, the liability seems greatest between 60 and 70. Very few cases survive two years from the first appearance of the symptoms: in scirrhus—the most common variety of gastric cancer—life will rarely be prolonged for three years; while in encephaloid and colloid, death often takes place within twelve months.

Symptoms.—During the early stage there are simply indications of dyspepsia, and in some few cases dyspepsia with gradual emaciation, may be the only phenomena observed throughout, but usually after a time more marked symptoms set in, which vary in character according to the situation of the disease. When it is in or near the cardiac orifice, there will be merely considerable pain and some difficulty on passing food into the stomach; if in the pylorus, pain and sickness, when a few hours after eating (digestion being completed) the chyme has to pass into the duodenum; while, where the lesser curvature is the seat of the affection, the suffering may often be very slight until near the termination of the case.

Speaking generally, the principal symptoms may be described thus:—Pain in the epigastrium, of a burning, lancinating, or gnawing character, augmented after eating, and often increased by pressure; retraction of the abdominal wall; eructations of fetid air; frequent nausea and vomiting, the matters ejected consisting at first of ingesta and glairy mucus, subsequently of a bloody sanious fluid, and sometimes of dark grumous matter having a coffee-ground appearance; constipation; together with an extreme and increasing emaciation and debility. Occasionally a pulsating tumour is felt in the epigastrium when the cancerous mass lies over the aorta; or merely a tumour may be detected in some part of the epigastric, umbilical, or hypochondriac regions so placed as not to receive any impulse from the bloodvessel. And then, in almost all cases, the countenance will present the peculiar cachectic hue and expression so characteristic of the cancerous diathesis.

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* *On Diseases of the Stomach*, p. 161. By Dr. George Budd. London, 1855.

Treatment.—As in all other malignant diseases our remedies for cancer of the stomach can only be palliative; for the disease makes continual progress, and rapidly exhausts the powers of life. Opium, administered either by the mouth, or rectum, or subcutaneously, will be necessary; and it should be given in free and repeated doses to subdue the pain. When the vomiting is very severe, nourishment must be given by means of enemata: where it can be borne, however, a milk diet with two or three raw eggs in the twenty-four hours will be serviceable. In some instances, perhaps it may be advantageous to lessen the work of the stomach by the administration of pepsine; but this remedy could only be of any real service at an early stage of the complaint. Cod liver oil is occasionally easily digested. If the eructations are very fetid, a little freshly-prepared wood charcoal will do good, or that made from vegetable ivory as suggested by Dr. Leared can be recommended, or charcoal biscuits may be had recourse to. The extract of belladonna, or a piece of lint soaked in hot tincture of opium, applied to the epigastric region will often prove grateful to the patient's feelings; or the subcutaneous injection of morphia can be tried; or a small blister may even be raised, and its raw surface afterwards dusted with from one-third of a grain to two grains of morphia, according to the patient's susceptibility to the influence of this drug.

IX. HÆMATEMESIS.

This term, signifying strictly vomiting of blood [Aῖμα = blood + ἐμίω = to vomit], is generally employed to denote hæmorrhage from the stomach. The blood is usually vomited in large quantities, is not frothy, is sometimes mixed with food, and is often of a dark colour from admixture with the hydrochloric acid of the gastric juice (all acids blacken the blood). Hence it presents marked differences from the blood in hæmoptysis; which is brought up by coughing in mouthfuls at a time, is of a florid red colour, is frothy, and is frequently mixed with sputa. Moreover, in hæmoptysis the hæmorrhage is generally preceded by cough, dyspnœa with palpitation, tickling in the throat, and a peculiar sensation in the thorax.

To make the distinction more clear, the chief signs of each variety may be thus tabulated :—

In hæmoptysis:—	*In hæmatemesis:—*
Dyspnœa; pain or heat in chest.	Nausea; epigastric tension.
Blood coughed up in mouthfuls.	Blood vomited profusely.
Blood frothy.	Blood not frothy.
Blood of a florid red colour.	Blood dark coloured.
Blood mingled with sputa.	Blood mixed with food.
Absence of melæna.	Melæna very common.
Bronchial or pulmonary symptoms.	Gastric or duodenal symptoms.

Hæmatemesis occurs every now and then without any appreciable cause; or perhaps it happens to be vicarious of some other hæmorrhage, especially of the catamenia; or it results from changes in the blood itself, as in scurvy; or it arises from aneurism of one of the abdominal vessels, the sac communicating with the bowels;* or it may be owing to congestion of the stomach from some impediment to the free passage of the blood, such impediment being due to disease of the heart, liver, &c. Thrombosis of the portal vein (arising either from disease of the coats of the vessel, or from obstruction of its canal by the compression of cancer or cirrhosis or abscess) has on more than one occasion proved to be the cause of fatal hæmatemesis. But the most direct provocative of this form of hæmorrhage is either passive congestion of the walls of the stomach, or simple or malignant ulceration. In simple ulceration, the blood most frequently comes away slowly, in small quantities, and often after a meal; though sometimes a large vessel is laid open, and a gush of blood takes place which possibly proves fatal. So also in the ulceration of a cancerous mass the bleeding is usually slight. When from any causes the extravasation is moderate, the vomited matters are said to resemble "coffee-grounds."

Hæmatemesis is more common in women than in men. It is generally preceded by a feeling of oppression and weight, by dull pain or tenderness in the epigastric and hypochondriac regions; as well as by a sense of anxiety and faintness. Often there is only nausea, dizziness, and lowering of the pulse in frequency and force. The hæmorrhage commonly produces great depression;

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* Dr. Gairdner has recorded (*Clinical Medicine*, p. 495. Edinburgh, 1862) an instructive example of aneurism of the superior mesenteric artery; which opened in the duodenum twenty-two months before death, causing repeated and very copious hæmatemesis. The symptoms and history closely resembled those of gastric ulcer. And there was this remarkable circumstance, that between the patient's admission (she was a servant girl, sixteen years old) into the Edinburgh Royal Infirmary on the 4th January, 1848, and her death on 28th November, 1849, complete convalescence took place. This was somewhat interrupted by an ulcer on the leg, amenorrhœa, and dyspepsia; but the hæmatemesis did not recur after the 7th February, 1848. On the day of her death she fell down suddenly in the street with an attack of syncope. At the autopsy it was found that the aneurism had burst into the peritoneum, in the cavity of which more than 3 lbs. of blood had been extravasated. The duodenal opening was closed.

owing partly to that alarm which is always engendered by "spitting of blood," and partly to the quantity of blood lost.

In gastric hæmorrhage, the blood frequently passes into the intestines, and is voided per anum; or part will be vomited and part expelled with the fæces. When the intestinal evacuations contain blood, whether this comes from the vessels of the stomach or only from those of the intestines, the patient is said to be suffering from *melæna* [Μέλας = black]. As this name implies, the evacuations are often black, and sometimes resemble tar; but the dark appearance is by no means constant, and does not occur if the blood comes away too quickly to be acted upon by the intestinal juices. Cirrhosis of the liver, or any disease which produces obstruction of the portal system, necessarily gives rise to congestion of the gastric and intestinal veins; a condition which often terminates in the extravasation of large quantities of blood that are expelled with the stools as well as by vomiting. Amongst the other less common causes of melæna may be mentioned enteritis, dysentery, intussusception, simple and carcinomatous ulcerations, aneurismal and other tumours, &c. It must not be confounded with bleeding from the rectum, owing to the presence of a polypus or of hæmorrhoids.

The *treatment* of acute hæmatemesis should consist in enjoining abstinence from solid food, with perfect rest in the horizontal posture; and in extreme cases it may be necessary to trust entirely to nutrient enemata for three or four days, no food or medicine being taken by the mouth. Cold acidulous drinks, ice, strong essence of beef, and perhaps some astringent Hungarian or Greek or Bordeaux wine may be prescribed. If the patient be prostrated, enemata of beef tea with port wine or brandy and a little opium will do much good. With respect to drugs, a mixture of gallic acid with the aromatic sulphuric acid (F. 103) will often answer well. The oil of turpentine is thought by some to be a specific (F. 102), while by others the first place is given to acetate of lead and opium. In one case, a single dose of a concentrated solution of the perchloride of iron (one teaspoonful in glycerine) effected a cure. Prolonged application of cold to the epigastrium is occasionally useful.

Where the bleeding is chronic, or when it is continuous but slight in amount, the mineral acids with bark (F. 376) will often do more real service than any other remedies. Quinine and iron, however, prove very valuable in some instances (F. 380). Cream, raw eggs, essence of beef, various broths, and perhaps cod liver oil, ought also to be allowed. As regards cases of melæna, where there is no gastric disease, active purging will be necessary; and hence a full dose of calomel and jalap or of podophyllin (F. 140, 160) should be given, followed by the common black draught or castor oil. Subsequently the mineral acids with bitters (F. 378) may be tried.

X. DILATATION OF THE STOMACH.

Dilatation of the stomach is a curious disease, to which attention has lately been directed. The enlargement is usually the irremovable issue of some affection of the pyloric orifice; which, causing contraction, prevents the food from readily passing into the duodenum. Occasionally dilatation occurs without organic stricture of the pylorus, and Dr. Fagge has described an acute form of the affection. Usually, however, the stomach slowly and gradually dilates; until at last it comes to occupy the greater portion of the abdominal cavity, giving rise to appearances as if a large tumour were present. These phenomena are the more deceitful when the stomach is full of fluid, because fluctuation may then be present: when this viscus contains gases only, there will be a widespread tympanitic sound on percussion. Sometimes the diagnosis of this condition may be made by observing the peristaltic movements of the distended organ, which extends downwards across the abdomen from left to right often to near the right iliac fossa.

The patient suffers severely from gastralgia, gastrodynia, pyrosis, flatus, constipation, and sometimes from vomiting. In two instances which I rather closely watched, the appetite was voracious to a marked degree; but whether this was partly the cause or the consequence of the dilatation can only be a matter of speculation. In favour, however, of its having been the cause it should be mentioned, that in one instance the symptoms during life were those of torpid digestion, with such mental depression that suicide was at length committed; while at the examination after death, no pyloric narrowing or other reason for the dilatation could be detected.

Where there is sickness, the vomited matters are frequently very large in quantity; while they rapidly ferment, are intensely acid, and often resemble yeast in appearance. On being microscopically examined, they are seen to contain large quantities of those vegetable parasites first described by Goodsir, the *Sarcinæ ventriculi*, together generally with the yeast fungus—*Torula cerevisiæ*. Dr. Todd discovered the sarcinæ in ulceration of the stomach with contraction of the pylorus; and he suggested that these vegetable organisms were the result of the long detention of food in the stomach. There is but little room for doubt that this explanation is correct. At the same time it is also probable, that the intensely acid fluid in which the sarcinæ are found may itself irritate and close the pylorus spasmodically. In such cases, consequently, if we check the formation of these growths we shall greatly relieve the disease. Thanks to Sir William Jenner and Professor Graham, we are enabled readily to accomplish this object by the administration of the sulphite of potash, or by the sulphite of soda; which latter (F. 48) is perhaps preferable, since it is a more stable salt, and is less liable to be decomposed by keeping than the sulphite of potash. The beneficial action of either of these salts depends upon their being decomposed in the stomach by the acids generated therein; sulphurous acid gas being liberated, which quite destroys the fungi. Dr. T. K. Chambers prefers the hyposulphite of soda, in doses of gr. 5 to 20, thrice daily. The patient's diet should be regulated, and it will be better for him to be allowed the unfermented in the place of the common houshold bread.

In severe cases great relief has been obtained by emptying the stomach by the stomach-pump and the organ may be washed out with warm Vichy water. This treatment, introduced by Kussmaul, has been curative in many cases, and may be adopted with advantage even before the dilatation is extreme.

XI. GASTRIC FISTULA.

In malignant as well as in simple ulceration of the stomach perforation will from time to time take place, with escape of the contents of this viscus—fortunately not always into the peritoneum. Communications are in this way occasionally formed through the parietes, between the stomach and the outside of the abdomen; or between the stomach and colon; or between the stomach and duodenum; or even between the stomach and the pleural cavities, lungs, or pericardium.

Gastro-cutaneous fistulæ will result from suppuration in the abdominal walls or from wounds, as well as from gastric disease. Dr. Murchison has recorded an extraordinary case, where, after the introduction of a seton into the epigastrium, the patient (an hysterical woman, 34 years of age) prevented the wound from healing by making constant pressure upon it with a penny-piece; the ulceration gradually advancing, until at the end of three years (in 1854) it penetrated into the stomach, this organ having become adherent to the abdominal walls. Three years afterwards (in 1857) the opening measured four inches transversely, and three from above downwards: while directly a plug which she wore was removed, the contents of the stomach escaped. The health was delicate, but improving.

Gastro-colic fistulæ are much more common than *gastro-duodenal;* while they have generally for their cause malignant rather than simple ulceration. In gastro-colic fistula, moreover, the stomach and colon are not always found closely adherent; but a cavity may intervene, as if a mass of cancerous or tuberculous matter had connected the two, and had been gradually hollowed out. The symptoms produced by such a fistula are chiefly fæcal vomiting, and the expulsion of undigested food with the stools;

owing, in the one case, to the retrocession of the contents of the colon into the stomach, and in the other to the passage of the gastric matters directly into the large intestine. When these effects follow upon the symptoms of malignant or simple gastric ulcer, the diagnosis cannot be a matter of much difficulty.

XII. DISEASES OF THE DUODENUM.

The small intestine, consisting of the duodenum, jejunum, and ileum, is a convoluted tube, some twenty feet in length. The duodenum [*Duodeni* = twelve; because this portion of the bowel was said by the ancients to be equal in length to the breadth of twelve fingers] extends from the pyloric orifice of the stomach to the jejunum, is some ten inches long, has no mesentery, is imperfectly covered with peritoneum, and is more fixed than any other portion of the small intestines. In it, the chyme having passed through the pylorus, becomes acted upon by the bile, pancreatic secretion, and intestinal juices; the latter being chiefly derived from Brunner's glands. With regard to the special diseased conditions of the duodenum, as distinguished from those of the small intestines generally, we know very little; and even that little is chiefly derived from examinations which have been made after death.

Duodenal dyspepsia is an obscure and troublesome complaint. It can generally be diagnosed when there is great pain about the region of the duodenum some hours after food has been taken. It is often accompanied by nausea, a feeling of faintness, and extreme depression of spirits; and occasionally by jaundice. The latter is not uncommon when the indigestion is due to the abuse of alcoholic liquids; in which cases also there is well-marked tenderness about the right hypochondrium, partly owing to the inflamed condition of the duodenum, and partly perhaps to sympathetic irritation of the liver.

Perforating ulcer of the duodenum presents many of the symptoms of an ulcer in the stomach, but in a mitigated form. Consequently fatal perforation occasionally takes place suddenly, when the patient has previously made but little complaint. A curious observation has been made by Cumin, Dupuytren, Long, Curling, and Erichsen, to the effect that a sloughing ulcer sometimes forms in the upper part of the duodenum within a few days after a severe burn, and doubtless in consequence of it. Still it will be satisfactory for this point to be further investigated, so as finally to refute or confirm the statement; inasmuch as Dr. Wilks, in many autopsies after death from burns, has found the duodenum free from all disease. When an ulcer exists, it is capable of producing diarrhœa with bloody stools, nausea and vomiting, severe pain three or four hours after a meal, and great prostration; while it may destroy life by hæmorrhage, or by peritonitis consecutive to perforation.

Supposing perforation to occur acute peritonitis is set up very rapidly, the suffering becoming most acute. In addition to great anxiety and general distress, there will be hurried breathing, urgent thirst, incessant vomiting of greenish bilious-looking fluid, and pain which is rendered most agonizing by pressure. In many instances there has been complete suppression of urine. So great is the suffering, that oft-times no justifiable dose of opium relieves it; and the practitioner is bound for very pity's sake to have recourse to the prolonged administration of chloroform by inhalation.

Primary cancer of the duodenum is a very rare affection. But this portion of the bowel not unfrequently becomes secondarily involved in the course of hepatic cancer, as well as in malignant disease of the pancreas or neighbouring lymphatic glands. In cancer about the pylorus, the disease does not spread into the duodenum as frequently as might be expected.

Obstruction of the bowels is seldom due to a mechanical impediment seated in the duodenum. I have seen an instance, however, where a very large biliary calculus had ulcerated through the coats of the gall-bladder, and where it was found, after death, as firmly impacted in the duodenum as a cork is wedged into the mouth of a bottle. The history and symptoms pointed strongly to obstruction by a biliary concretion, and to such obstruction being situated high up in the bowel, but the site could not be more accurately defined. For although the secretion of urine was very scanty, the vomiting an early symptom, and the matters ejected bilious but free from stercoraceous odour, yet the same occurrences take place in occlusion of the jejunum.

A small nematode helminth—the *Sclerostoma Duodenale* or *Anchylostoma Duodenale*—is occasionally seen in the human duodenum and jejunum. The female worms are more numerous than the males, and are rather larger; the latter measuring about one-third of an inch in length. There are four oral papillæ, by which it attaches itself very firmly to the mucous membrane of the bowel. This entozoon is found in the inhabitants of Northern Italy, but especially in those of Egypt. The chief symptoms produced by it are stools containing small quantities of blood, slowly progressive emaciation and debility, possibly albuminuria, and ultimately severe anæmia. From the latter, the disorder is known as *Egyptian chlorosis.*

Post-mortem perforation of the duodenum is apt to occur under the same conditions as give rise to it in the stomach; provided that, in addition, the pyloric orifice is so patulous that the gastric juice readily flows through it. Under these circumstances, the coats of the duodenum will possibly be found even more extensively acted upon than those of the stomach.

XIII. ENTERITIS.

Enteritis [from Ἔντερον = an intestine + the terminal *-itis*], or inflammation of the small intestines, varies much in severity; being sometimes so slight as hardly to attract notice, and now and then so severe as to threaten or even rapidly destroy life.

The intestine is very seldom affected throughout its whole extent; but I know of no marked signs by which we can localize the morbid action so as to assert that it is only in the duodenum, or in the jejunum, or in the ileum. Moreover, the inflammation may affect all the coats of the intestine or only the mucous lining; the latter, distinguished as muco-enteritis, being a not uncommon disease of childhood, particularly during the progress of dentition.

Muco-enteritis is frequently met with, while enteritis involving all the structures of the bowel is rare as an idiopathic affection. It may result from strangulation in its various forms, from impaction of a foreign body, &c., complicating these conditions, and indeed giving rise to the more prominent symptoms attending them. In the severe forms of muco-enteritis the mucous membrane will be found congested, thickened, and softened, the surface covered with threads of false membrane, and extravasations of blood are seen in patches, especially on prominent folds. In milder cases an excess of mucus, with perhaps some congestion, will constitute the only evidence of inflammation. Occasionally ulcerations are met with. In enteritis proper the portion of intestine affected, often only a short length, will be purple or dark grey externally, and may present shreds of lymph; the muscular coat is thickened and infiltrated with inflammatory products, while the mucous membrane is congested, marked by patches of extravasated blood, or even gangrenous. It is always dilated from paralysis of the muscular coat, and the bowel above is usually full of fluid which the inflamed portion has been unable to transmit downwards.

Symptoms.—Enteritis generally sets in with rigors, hot skin, thirst, and a hard and frequent pulse. The patient complains of severe colic-like pains about the belly, especially around the umbilicus, and of distressing nausea and vomiting; and with the pain there is extreme tenderness on pressure, whereas in colic pressure gives relief and the patient lies on his back with his knees drawn up so as to relax the parietes of the abdomen. The bowels are obstinately constipated from the first. Very quickly these symptoms are followed by gradually increasing tympanites, the pain usually diminishes and may entirely cease, but the vomiting and constipation continue, hiccup is frequently troublesome and a state of collapse comes on. The face becomes pinched and anxious, the pulse small, the extremities cold, the surface bathed with cold perspiration; usually the intellect remains clear to the last. The vomited matters at first consisting of the contents of the stomach with the gastric secretion and bile, later become highly offensive, and are sometimes stercoraceous. The pulse is at first full and hard, but it soon becomes wiry and almost imperceptible.

Muco-enteritis, or inflammation of the lining membrane of the intestine, now and then occurs in young children from six to eight months old. The infant gets hot and restless in the early stages, and suffers from thirst; the tongue becomes dry or covered with a brownish crust; there is frequent screaming, and disturbed sleep; the abdomen becomes distended from flatus, while there is pain which is increased on pressure; and there is irregular action of the bowels—in most cases diarrhœa, the fæces being green and offensive and often discharged with considerable force. Towards night there is usually an exacerbation of the febrile symptoms. Thus far the disease does not differ much from a sharp attack of diarrhœa. Severe constitutional symptoms, however, soon set in: such as great febrile oppression, thirst, vomiting, dryness of the tongue, watery diarrhœa, &c.; followed by rapid and unexpected exhaustion, or sometimes by coma with a peculiar pale and waxen appearance of the body. These symptoms may come on before the disease has lasted any considerable time, and whilst it can scarcely be distinguished from the ordinary bowel complaints of children. It should be remarked that an erythematous redness is generally observed around the anus.

Diagnosis.—Enteritis has been more than once mistaken for hernia, or for obstruction of the bowels from some internal cause. A careful examination of those regions at which intestinal protrusion may take place, should be made; while the general history of the case must be well considered. In mechanical obstruction not involving strangulation the symptoms come on slowly and steadily, the sickness is urgent, the pain is fixed, and there have often been previous attacks of constipation: with intussusception there is sudden pain like that of colic, with the discharge of a bloody mucus. Colic is recognised by the absence of tenderness on pressure and by the temperature remaining normal.

Enteritis from chronic poisoning is not to be easily distinguished from inflammation due to natural disease. But in the former the vomiting is most urgent, the stomach rejects everything, there is diarrhœa after taking food, and the pain is less severe. Where there is the least doubt, however, all the excreta should be analysed; while until the uncertainty is removed, care must be taken that the food and medicines cannot be tampered with.

Hysterical tympanites, peritonitis, cerebral disease, and suppression of urine (any of which may induce sickness and constipation) have been mistaken for enteritis, though it seems difficult to imagine how such an error could be committed.

Treatment.—Opium freely administered is invaluable; while hot fomentations sedulously applied to the abdomen will also give great relief. Perfect quiet in bed must be enjoined. All purgatives are to be rigidly avoided; though attempts ought to be made to empty the lower parts of the intestinal canal with simple enemata, especially by warm water thrown up in large quantity, gradually and slowly, by means of a long flexible tube (such as that of the stomach pump). After the inflammation has ceased, mild aperients, particularly castor oil, may be prescribed; followed by vegetable tonics, such as the infusion of cascarilla or the tincture of bark. In strumous subjects cod liver oil, or glycerine and steel wine, do good service. The diet should be very simple: it ought to consist chiefly of demulcent drinks, mutton and chicken broth or beef tea, and farinaceous foods with milk. Ice or cold water can be freely allowed with the best consequences. Where there is a disposition to collapse, stimulants must be resorted to.

In the muco-enteritis of children, opium must be given with very great caution. The warm bath, followed by fomentations or linseed poultices to the abdomen, will give relief. Chlorate of potash in weak tea or sugared water is often useful; or if an astringent be needed, the tincture of kino and decoction of logwood will best answer our purpose. When the child is at the breast, no other food should be allowed: otherwise the diet must be very mild, consisting chiefly of milk with a little broth, and nicely flavoured mucilaginous drinks. Goat's milk is often more easily digested than cow's or ass's milk; especially if the animal be kept clean, and fed upon hay and clover. Moreover, whichever milk be ordered, it ought to be tested with litmus paper; so that if it be found to have lost its alkaline property, the acidity may be neutralized by the addition of three or four grains of carbonate of soda to the half-pint, or with a few drops of the saccharated solution of lime. Where there is much exhaustion, from ten to thirty minims of brandy in thin milk arrowroot, or in cold sugared water may be given at short intervals; while sometimes, when the case has seemed almost hopeless, I have been much gratified at finding recovery follow upon the use of a solution of raw meat (F. 2). When a case is seen early, a most efficacious plan of treatment is to withhold all food except weak barley water with a little sugar and perhaps a few drops of brandy for 12 or 24 hours, giving small doses of laudanum and spirit of chloroform or ether in dill-water at frequent intervals. The mercury and chalk powder is often given to children directly an inflammatory disorder is diagnosed. I have seen it administered in muco-enteritis, and invariably it has aggravated the symptoms.

A thickened state of the coats of the intestines frequently results from inflammation of a chronic or subacute kind or from lardaceous change. An irritable mucous membrane accompanies this condition: whilst the peristaltic movements are impeded by the deposit of exudatory matter in the intestinal walls. Hence, it results, that the characteristic symptoms consist of attacks of diarrhœa, or even of mild dysentery, alternating with constipation and retention of scybala; together with slight tenderness on pressure, and a feeling of resistance on practising palpation over the affected parts. Friction with iodine ointment, a nourishing but unstimulating diet, and regulation of the bowels by astringents or by mild alterative aperients—according as diarrhœa or constipation exists, will often remove the deposit.

XIV. INFLAMMATION OF THE CÆCUM.

The cæcum or its appendix (situated in the right iliac fossa, and covered only anteriorly and laterally by the peritoneum) is now and then found seriously diseased, without any other part of the intestines being involved. Thus, severe colic and even fatal obstruction may arise from the lodgment in this portion of the alimentary canal of hard fæcal matter, skins or stones of fruit, portions of unripe apples or plums, biliary and intestinal concretions, balls of lumbrici and oxyurides, &c. Sometimes the intestinal matters accumulate to such an extent as to produce a large tumour; and many are the cases where patients have recovered upon passing an immense quantity of fæces, after a careless examination has led the practitioner to diagnose ovarian disease, or abscess or cancer of the right kidney. When any of the foreign matters get impacted in the vermiform appendix or the cæcum, dangerous inflammation ending in abscess is very likely to arise; while, as we shall presently see, the persistence of disease in the appendix will occasionally form the starting-point of the morbid action in the cæcum itself.

The inflammatory process may affect only the vascular mucous surface, or all the coats of the cæcum; in either case, the affection being termed *cæcitis* [*Cæcus* = blind + the terminal -*itis*], or *typhlitis* [Τυφλὸς = blind + the terminal -*itis*]. So we can merely have *inflammation of the appendix cæci*, which is attended with more acute symptoms than simple typhlitis. Or the abundant connective tissue which attaches the cæcum to the psoas and iliac muscles will be especially involved; and then *perityphlitis* [Περὶ = around + τυφλὸς; terminal -*itis*] is the rather pedantic name applied to the disorder.

Whether it be true or not that an important part of the process of digestion is carried on in the cæcum, it cannot be denied that irritation and perhaps the suspension of the functions of this part by disease soon gives rise to prominent and distressing *symptoms.* Thus there is always more or less general constitutional disturbance, slight fever, sleeplessness, anorexia, most troublesome nausea with retching, and either diarrhœa or looseness alternating with constipation; together with fulness and tenderness about the right iliac region, the pain being rendered exquisite by pressure upon the cæcum or the parts in its immediate vicinity. The patient lies on the back or on the right side; with the trunk somewhat bent and the knees drawn up, so as to relax the tissues about the seat of inflammation. The pulse is not quickened to the same extent, nor is the countenance as anxious, as in peritonitis or enteritis. Supposing the disease to progress, the peritoneal surface of the cæcum becomes involved, the appendix gets inflamed, and we are very likely to have evidence of the existence of general peritonitis; while the surrounding connective tissue also becomes affected, and suppuration and abscess result. The latter may open externally, or into the intestinal canal, or into the vagina; the patient recovering at least temporarily. Unfortunately, the abscess often slowly fills again; and this happening time after time, and the pus burrowing in various directions, the most serious complications arise. Where, in the first instance, the purulent matter is discharged into the cavity of the peritoneum, this untoward accident is followed by great suffering, and in a few hours by death.

When the inflammation begins in the appendix from constitutional causes or owing to the escape into this part of morbid materials or foreign bodies, the symptoms are usually very acute from the commencement; consisting especially of excruciating tormina, tympanites, hiccup, violent sickness, pain in the right ovary or testicle and thigh, and obstruction of the bowels. Gangrene of the affected part, with general peritonitis, frequently ensues and proves fatal. Or, a portion of the large intestine and cæcum with the vermiform appendix may slough off, and be passed away in a stool; restoration to health perhaps following at the end of a few weeks. In tuberculous typhlitis, ulceration occurs more frequently in the appendix than in the cæcum itself.

The early symptoms of perityphlitis are severe pains shooting from the right iliac region, diarrhœa and tenesmus, sickness, mental depression, great restlessness, fever, &c. The parts around the seat of inflammation become swollen and unless resolution take place suppuration occurs. Frequently the abscess opens into the cavity of the cæcum, and then with care the patient recovers.

Occasionally the physician meets with tedious cases of chronic inflammation of the cæcum. The symptoms come on very slowly and insidiously. There are paroxysmal attacks of pain, indications of failing health, weakness and loss of flesh, colicky pains in the right iliac region, and flatulence and anorexia. Diarrhœa alternates with constipation. Frequently the mucous coat of the bowel ulcerates, and then numerous mucous discharges with attacks of hæmorrhage ensue; the loss of blood at times being considerable. Where there is much thickening and tumefaction of the walls of the cæcum, the case might be mistaken for an aneurism of the iliac artery. If death occur, it is generally from exhaustion; while at the necropsy the intestinal coats are found considerably hypertrophied, inflamed, and ulcerated. Very rarely is there perforation.

The *treatment* of all affections of the cæcum requires considerable caution. I have had to watch a few cases where no little mischief has arisen from the abuse of purgatives; and in one particular instance had it been necessary for me to state the cause of death, I could hardly have conscientiously given any other certificate than—"Compound colocynth pills." Generally speaking, anodyne fomentations or poultices will have to be assiduously applied, while opium ought to be given internally. This latter remedy must be used in doses sufficient to keep the patient free from pain; and its influence should be maintained for several days. Prolonged hot hip-baths often give great relief. Effervescing drinks, soda water or lemonade, bismuth, diluted hydrocyanic acid or laurel water, and ice will be useful in relieving the nausea; while if it appear necessary to interfere so as to obtain an action from the bowels, castor oil enemata may be employed. Great care must be taken to keep the patient quiet in bed, as well as to enforce the use of only liquid nourishment, until all symptoms of disease have completely passed away. When there are rigors and other indications of suppuration having occurred, milk or cream, raw eggs, essence of beef, and bark with brandy or port wine will be needed. If the abscess point externally, it should be cautiously opened. Subsequently, comfort will often be derived and the abscess prevented from refilling by the guarded employment of regulated pressure. A shield of gutta percha moulded to the part, padded with wool and then lined with chamois leather, and kept in place by an ordinary truss spring, will prove an efficient instrument.

In chronic cases I have seen most good from simple nourishing food, from which potatoes and table vegetables generally should be excluded, warm bathing, sedative applications (F. 165, 281) used night and morning, and the administration of cod liver oil; together with the employment of small doses of the mineral acids with quinine (F. 379), or of iodide of ammonium and bark (F. 38).

XV. DYSENTERY.

Dysentery [from Δυς = difficulty or badness + ἔντερον = intestine] consists of a specific inflammation and ulceration of the mucous membrane (occasionally also of the other tissues) of the colon, especially perhaps of the lower part of this gut and the rectum. The morbid action is attended with considerable febrile disturbance, frequent mucous and bloody stools, tenesmus, and griping pains. There is a tendency to great prostration. The disease has been sometimes termed *colitis*. Cases, however, are occasionally seen in which the ulceration does not stop at the ileo-cæcal valve, but extends for many inches up the small intestines.

Causes, &c.—Severe dysentery is now a comparatively rare disorder in this country, either as an idiopathic affection, or as a complication of some other disease. It appears, however, occasionally to prevail as an epidemic in our prisons, or in unhealthy localities; for during the last ten years (1857-66) the deaths registered from it in England have annually ranged between 1000 and 1698. In tropical regions it is at times very prevalent, and is often particularly fatal to our soldiers and sailors. Miss Nightingale has remarked that the per-centage of mortality in acute and chronic dysentery was perhaps greater in the Crimea (1854-55), owing to bad food, than has even been known in any disease except the worst form of epidemic plague.

Dysentery has been ascribed to the action of wet and cold and damp night air, to contagion, to malaria, to drinking polluted water, to intemperance, to deprivation of fresh vegetables and fruit, to impure or insufficient or salt food, to detention in crowded barracks or transport ships, to insufficient clothing and bedding, to poisoning by retained excretions, to the use of drastic purgatives, &c. All cachectic states of the system predispose to it, in those countries where paludal fevers are rife. Moreover, intermittent or remittent fevers and dysentery often coexist, or they succeed each other in the same individual. Whether malaria can be said to be an exciting cause of dysentery, as it is of paludal fevers, is uncertain.

Symptoms.—At the commencement, there will be found general uneasiness, pains in the abdomen of a griping character (*tormina*), with a frequent inclination to go to stool. This necessity being gratified, the action is followed by relief. As the disease becomes developed, and as ulceration or sloughing commences, the desire to empty the bowel gets more frequent and imperative, while the ease which succeeds is more transient. The evacuations are thin, mucous, and bloody; and frequently they are mixed with small, hard, separate lumps of fæces, termed *scybala*. The scanty evacuations soon produce distress rather than relief. The patient is constantly tormented with tenesmus and griping; the stools become fetid, dark-coloured, and mixed with blood and purulent matter and shreds of lymph; while the bladder sympathizes with the rectum, causing frequent micturition. The urine also is high coloured, and gives rise to scalding when passed: sometimes there is strangury.

With regard to the other symptoms it must be noticed that in all instances there is more or less fever with constitutional disturbance. In mild cases the fever is slight; and there will be neither depression, nor loss of appetite, nor an unnatural appearance of the tongue. But usually complaint is made of restlessness and inability to sleep; the countenance is anxious; and there are troublesome cramps. The tongue is furred, and the papillæ prominent; the pulse is frequent and small; skin harsh, hot, and dry; thirst urgent, with a total disgust for food; while there are fits of dyspnœa, and great prostration. Supposing that the patient recovers, the symptoms of amendment set in very gradually, beginning with an abatement of the purging and pain; while for some few weeks we never can feel certain that a relapse may not suddenly take place. Convalescence is usually protracted. On the other hand, in fatal cases, the abdomen becomes tense and full and tender, especially on pressure; the pulse gets weaker; the tongue is found dry and red and glazed, with aphthæ about its root and on the insides of the lips and cheeks; and there will be continued wakefulness, or short disturbed snatches of sleep. The evacuations are now extremely offensive and shreddy and watery; there is a repulsive corpse-like odour about the body; hiccup comes on, with great exhaustion and emaciation; and then death soon follows.

During the American war there were many cases of chronic camp diarrhœa in which, after the patients had passed two or three loose stools daily for several days, acute dysentery set in suddenly. Frequently, in addition to severe tormina and tenesmus, there would be low fever and muttering delirium; succeeded by fatal sinking at the end of a few days. After death, the ulcerated colon was found coated with croupous lymph. In other instances, such complications as serous apoplexy, diphtheria, pneumonia, albuminuria, &c. were met with.

Complications.—This disease may be complicated with some form of continued fever, with scurvy, with enlargement or inflammation of the liver, or with hepatic abscess. The two latter occurrences are so frequently met with in hot climates, that in all cases the liver should be daily examined; such examinations being continued for some short time after the prominent symptoms have ceased. Whether dysentery and abscess of the liver have any mutual relation is still undecided; but the balance of evidence seems to be in favour of their being dependent on the same cause, though unconnected with each other. According to Dr. George Budd, the abscess is the consequence of the dysentery; the former resulting from the fetid gaseous and liquid contents of the bowel, or the unhealthy pus produced by its ulceration, being absorbed and conveyed immediately to the liver. In opposition to this view it is to be noticed, that out of many hundreds of cases of dysentery which occurred in Millbank prison during seven years, not one (according to Dr. Baly) was complicated with hepatic abscess, and it is stated that the hepatitis resulting in abscess often precedes the dysenteric symptoms.

Terminations.—Dysenteric inflammation, when violent, may end in perforation of the bowel and fatal peritonitis; or in rupture and fæcal abscess; or in pyæmia and secondary abscesses; or in healing of the ulcerations, with subsequent troublesome constipation from the contraction of the cicatrices; or in fatal exhaustion, particularly where the mucous membrane has got sphacelated.

When the disease becomes *chronic*, it is often most intractable. There is usually atrophy of the mucous membrane, with degeneration of the glands; or imperfectly cicatrized ulcers remain in the mucous lining of the cæcum, colon, or rectum. Many of these cases ultimately recover; but in other instances the sufferer gradually wastes away, the skin is rendered harsh and dry and scaly, there is improvement one day with a relapse the next, the tongue is florid and glazed, the discharges of fæcal matter mixed with thin pus and blood are most offensive, while the griping pains and tenesmus, &c., exhaust the patient so thoroughly that death is looked forward to as a welcome source of relief.

The immediate mortality from this disease, in hot climates, varies from five to thirty per cent. of those attacked. According to several authorities, where it does not at once end fatally, it leads (when once fairly impressed on the system) to so much suffering and slow exhaustion, that life is ultimately destroyed by it.

Pathology.—This disease commences as an affection of the tubular and solitary glands of the large gut, which glands get enlarged and filled with a jelly-like substance. After a time, the glandular structures rupture and an ulcer is formed; and this happening in several parts large patches are produced by the ulcerations running into each other. Then, too, the intervening mucous membrane gets inflamed and pulpy, secretes a large quantity of mucus, and readily bleeds under the influence of any irritation. After death the most extensive and ragged ulcerations are found; with perhaps portions of the mucous coat in a sloughy or gangrenous condition. The mesenteric glands are often swollen.

Rokitansky states that the dysenteric process is divisible into four degrees or stages, ranging from inflammation and softening of the mucous lining of the colon to complete mortification. Dr. Parkes considers that ulceration is always present, and that the solitary glands are much affected. Dr. Habershon thinks it probable that the diseased condition is closely allied to that of the pharynx in diphtheria; and that in severe examples the membrane rapidly sloughs, without antecedent ulceration.

Treatment.—Bloodletting, both by the lancet and by leeches applied in the track of the colon, is usually recommended; this practice being, I believe, still adopted by many. In the dysentery of this climate, it is worse than unnecessary to bleed; while it is equally injurious to administer large doses of calomel. And this is probably the case in most countries; but it is certainly so when the morbid action has advanced so far that there is ulceration running into gangrene of the affected tissues.

During the early stages our object ought to be to soothe the inflamed membrane, and to remove all sources of irritation. Hence, demulcent drinks must be copiously given; while the diet is to be free from stimulants, and of the lightest kind—farinaceous food, cream or milk, calf's foot jelly, and thin broths. Perfect rest in bed, in a well-ventilated apartment, is desirable even in mild cases. The warm bath can be frequently employed with great advantage; while the wet compress, fomentations, and hot poultices always afford great relief. When we fear the lodgment of scybala, a few doses of castor oil may be given, the action of which should be aided by enemata of gruel; or a plan of treatment which is often efficacious is to give drachm doses of sulphate of magnesia with tincture of hyoscyamus every three or four hours till the aperient effects of this salt become evident, and afterwards a Dover's powder or hyoscyamus and opium in mucilage. The bowels having been thus acted on, no remedy appears to exert so good an effect as ipecacuanha. This agent seldom produces nausea and vomiting, when given in large doses; while it is beneficial by its action upon the skin, and by causing an increased secretion of mucus. The best mode of administering this drug, either in the dysentery of tropical regions or in such severe forms of it as occasionally occur in this country, is as follows:—A large and hot linseed poultice, containing two or three tablespoonfuls of mustard, is to be applied over the epigastrium. Next, a full dose of opium, proportionate to the age, is to be exhibited in the form of an enema or suppository; and then thirty or forty-five minutes afterwards (the use of fluids having been interdicted for three or four hours previously), a dose of from thirty to sixty grains of ipecacuanha powder should be given in the form of a bolus, or wrapped up in wafer-paper, or suspended in a small mucilaginous draught. A second dose is seldom needed; but if required, it may be ordered at the end of six, twelve, or twenty-four hours. If preferred, a decoction of ipecacuanha may be taken, made with an ounce of the bruised root to the pint of water. The whole is to be consumed in the twenty-four hours, diminishing the strength of the mixture as the symptoms lessen. Emetina again, the active principle of ipecac, has been successfully employed.

When the dysenteric inflammation has reached an advanced stage (when there is extensive disorganization of tissue) then there are still two points to be aimed at—viz., to support the general strength, while the diseased structures are to be kept as quiet as possible. Under these circumstances, ipecacuanha, followed by tonics and astringents and opiates, are to be the tools with which we work. Supposing the patient to be very weak and anæmic, we may try such remedies as salicin, quinine, bark, cascarilla, or some mild preparation of steel; although if the dejections continue abundant and frothy and sanguineous, we are first to use bismuth, gallic acid, kino, logwood, iron alum, or sulphate of copper. In both classes, but chiefly in the last, opiates by the mouth or subcutaneously, or often preferably by the rectum, will be invaluable. The diet ought to be generous; milk, raw eggs, strong broths, restorative soup (F. 2), ripe grapes, and perhaps alcoholic stimulants well diluted, being necessary. In scorbutic cases a free supply of lemon or orange juice is to be allowed.

For chronic dysentery the patient must seek relief in a mild, dry, equable climate. If unable to obtain change of air, he should be treated according to the principles just inculcated. The different preparations of bael or Bengal quince are much used in India. They seem to have a twofold property, first being astringent and then aperient; and they are especially recommended where the stools are frequent and mixed with blood and mucus, while the system is free from fever (F. 97). The Australian red gum has also been found useful in these cases, and may be given alone or in combination with the bael. The remedy which seems to have had the most salutary effect in the chronic dysentery from which our soldiers suffered in the Crimea, is morphia. One grain of the hydrochlorate was given twice or three times a-day, with some aromatic spirits of ammonia and nitrous ether.

XVI. DIARRHŒA.

In most works on practical medicine many varieties of diarrhœa are described, such as the fæculent, the bilious, the mucous or catarrhal, the dysenteric, &c. These subdivisions are, however, quite unnecessary. It would seem much better to apply the term *diarrhœa* [Διαῤῥέω = to flow through] to all examples of simple purging; that is to say, to those cases in which the alvine evacuations are frequent, and loose or liquid, without any coexistent inflammation of the intestines.

Causes.—The causes of diarrhœa are numerous; the most common being over-feeding, or the use of improper food—such as unripe fruit, raw vegetables, sausages, pork, veal, goose, duck, salmon, &c. It may follow exhaustion consequent upon starvation, or the drinking of foul water, or the inhaling of fumes from decaying animal or vegetable matter, or great mental emotion, or exposure to damp and cold or to too great heat. From the latter cause relaxation of the bowels is common during the summer months; and hence it is frequently termed summer or English cholera. Diarrhœa is often also a symptom of many different diseases, as of phthisis, typhoid fever, congestion of the liver, &c. But when simple diarrhœa prevails in a household, or in a community, it may be set down as due to some unhealthy state of the atmosphere, or to the use of contaminated water, or to the consumption of bad food.

Symptoms.—In addition to the purging there is generally some degree of nausea, a dirty or furred tongue, foulness of the breath, flatulence, and tenesmus. There are also griping pains, acid eructations, &c. Moreover, the stools are unhealthy; either consisting of liquid fæces, or of a watery fæculent mucus, or of a thin frothy serum, or of a pale yeast-like matter. In severe summer cholera the evacuations are often composed chiefly of bile, the pains in the abdomen become violent, there are cramps in the legs, the patient complains of being chilly, and the depression is frequently great.

Prognosis.—This is usually favourable; except in the diarrhœa of young children, or of old people with enfeebled frames, or in purging complicating some exhausting disease. Nevertheless, the fatality of diarrhœa has much increased since 1838, when the deaths from it in England amounted to 2482. Thus in 1847, the number was 11,595: in 1857—21,189: in 1861—18,746: in 1863—14,943: in the three following years 16,432 and 23,531 and 17,170.

Diagnosis.—Diarrhœa is distinguished from dysentery by the absence of blood from the stools, and by the comparative mildness of the tenesmus and general disturbance. From cholera it is diagnosed by the comparative mildness of the symptoms, &c.; though this affection often commences like a common diarrhœa.

As an important point in practice it must be remembered, that in examples of fæcal accumulation there is constantly tenesmus with the frequent passage of small quantities of liquid fæces. I have seen more than one instance where the patient's life has been endangered by recourse being had to chalk mixture and opium, when the removal of a hard mass with the help of enemata and the scoop ought to have been adopted. Again, cases in which the power of the sphincter ani has become diminished, either from paralysis or from very great prostration, are sometimes mistaken for diarrhœa. Where the rectum is irritable and the sphincter weak, matters which would otherwise remain some hours and accumulate, pass away at once. Of course no benefit can arise from treating such cases as if they were instances of simple purging. The recumbent posture, ferruginous tonics, cold sponging or bathing, and good diet will more probably effect a cure.

Treatment.—This will manifestly depend upon the cause. When the purging arises from the presence of some offending matter in the intestinal canal, the expulsion of such matter must be aided by administering from five to ten grains of powdered rhubarb, or about two fluid drachms of the tincture of rhubarb, or half a fluid ounce of castor oil; combining a few drops of the liquid extract of opium with the draught if there be much pain. Granting no such cause exists, we can endeavour to relieve the symptoms by a draught of ether and opium (F. 85); or by two or three doses of calomel and opium (F. 25); or by the chalk mixture with catechu, &c. (F. 97); or by the officinal aromatic powder of chalk and opium; or by sulphuric acid and opium (F. 100); or by a mixture of matico and rhatany (F. 105); or by kino and ipecacuanha and logwood (F. 108). Many cases may be quickly cured by thoroughly washing out the rectum with warm water; immediately afterwards employing the officinal opiate enema, or a suppository of opium (F. 340). Ten or fifteen grains of tannic acid added to the enema will now and then increase its efficacy. Where the irritation appears to be kept up by fæcal fermentation, no remedy proves more serviceable than fresh vegetable charcoal (F. 98). Ipecacuanha and opium are especially useful in the diarrhœa of children, or in that of adults when due to inflammatory congestion of the mucous membrane of the intestine (F. 333, 324, 339). Attention must invariably be paid to the diet; emollient drinks, tapioca or sago or arrowroot milk, custard or baked rice puddings, and white fish only being allowed during, as well as for a few days after, the attack. If any stimulant be needed, a little cold brandy and water may not prove injurious. Moreover, where the intestinal canal is irritable, subjecting the individual to attacks of diarrhœa on slight causes, great benefit will often be derived from constantly wearing a flannel roller wound twice or thrice round the abdomen. This practice has also been found useful by those who have resided in tropical climates; and who, having suffered from yellow fever, dysentery, &c., are liable to looseness of the bowels.

XVII. COLIC.

Colic [Κῶλον = the large intestine] is characterized by severe twisting pain in the belly, especially about the umbilicus, occurring in paroxysms. There is no inflammatory action in simple colic, and the pain is relieved by pressure. The disorder is accompanied by constipation, and often by vomiting; there is no fever, and no quickness of pulse; neither do we find any depressing anxiety as in enteritis, although the pain may be as severe.

Attacks of colic often arise from indigestion accompanied with flatulence; the suffering being severe until vomiting, or eructation, or expulsion of the wind by the anus gives relief. A second common cause is the presence in the bowel of morbid secretions, or of retained excrementitious matters; easily cured by hot brandy and water, and a dose or two of castor oil. Then we from time to time have to treat nervous or spasmodic colic, such as occurs from fright, cold, hysteria, gout, &c.; and which demands the use of antispasmodics, like ether, chloroform, belladonna, and opium. Lastly, we may have colic from the slow cumulative action of mineral poisons, such as copper, lead, &c.

Flatulent colic, or that which arises from the undue accumulation of air in the stomach or intestines, is attended with pain, depression, and coldness of the surface. The air is generally derived from the decomposition of the food and glandular secretions; while there is every probability that, in certain states of the system, gaseous exhalations can take place from the mucous membranes. Air swallowed with the food may be a cause of excessive flatulence; examples of which are often seen in infants when they have been fed from a bottle by a careless nurse.

Flatulence [from *Flo* = to blow up] may exist as an idiopathic disorder, or it may be symptomatic of some other affection. In the first case, the flatus is usually most abundant when the patient has been fasting, and its presence is unaccompanied by any marked derangement of the general health. Nervous and hypochondriacal women who partake freely of tea, are liable to it; or it can be produced by the use of any food which is liable to undergo fermentation. There is generally a want of tone about the system, and especially a relaxed condition of the muscular fibres of the intestinal walls. In the second place, the flatulence is an attendant upon indigestion, inflammatory disorders of the stomach or bowels, organic disease of the liver, peritonitis, pelvic cellulitis, typhoid fever, uterine or ovarian irritation, gout, &c.

Idiopathic flatulence is generally to be cured by the avoidance of vegetable food and tea and beer; by the use of tonics, especially the mineral acids with strychnia or nux vomica (F. 376,-378); and by the exhibition of creasote (F. 41), or vegetable charcoal (F. 98). In tympanites from intestinal atony and weakness of the abdominal muscles, electricity is very useful; it being sufficient to apply both electrodes on different points of the abdominal parietes, and not to place the positive electrode in the mouth and the negative in the rectum, as advised by Becquerel. Supposing the distress proves so urgent that immediate relief is demanded, a draught containing spirit of chloroform or ether, carbonate of magnesia, &c. (F. 62, 85, 86), will be found most efficient; while a turpentine stupe had better be applied over the belly. The symptomatic variety of flatulence will have to be treated in various ways according to its cause. Conditionally that their employment is not forbidden by the nature of the existing disease, enemata of turpentine, assafœtida, and rue (F. 189) will be useful; while when the quantity of air is excessive its escape may be facilitated by passing the tube of the stomach-pump for several inches up the rectum.

In *copper colic* the pain often comes on very suddenly, and is aggravated by pressure; the distress being most severe at the pit of the stomach, or lower down—just above the umbilicus. The paroxysms are often of short duration; though they may possibly last for twenty-four or thirty-six hours. The bowels for the most part act regularly: there will generally be nausea and vomiting. The complexion is of a peculiar sallow hue, the countenance is anxious, the eyes appear sunken and the lips livid, while around the gums is a purple line which is characteristic of copper poisoning. Sometimes there are attacks of dyspnœa from laryngeal and bronchial spasm, possibly due to the inhalation of minute particles of copper. This disease is not frequently met with. The sufferers are coppersmiths, but principally and most severely the workers in copper at ship-building yards, &c. According to Dr. Maisonneuve no injurious results are produced by the working of cold metallic copper. The ill effects are observed when the fused metal is poured into moulds, or in workshops where molecules of oxide and carbonate of copper float largely in the air, whence they get introduced into the air-passages and alimentary canal.

The management of these cases is simple. Attempts ought to be made to eliminate the poison from the system by purgatives; while the patient is to be relieved at the time by hot baths, sulphur baths, turpentine stupes or sinapisms, and the administration of ether with opium. The men often treat themselves, milk in large quantities being a favourite remedy. Efficient ventilation of the workrooms, and habits of temperance, must be enforced.

Lead colic—or *Colica Pictonum*, so called from its former frequency among the Pictones or inhabitants of Poitou—has superadded to many of the symptoms already mentioned, an intense grinding or twisting sensation around the navel, with retraction of the abdominal integuments towards the spine. There is usually pain in the back. The existence of a blue or slate-grey line around the edges of the gums is a pathognomonic symptom of the presence of lead in the system. Painters most frequently suffer from lead colic, in this country: they often have several attacks before the muscles of the arms become affected with paralysis, causing *drop wrist*. Sleeping in a recently painted room, drinking fluids which have been kept in leaden vessels, or water which has been kept in leaden cisterns, and especially rain water which from the absence of salts does not readily form an insoluble protective film over the lead: taking snuff adulterated with lead, &c., are not unfrequent causes of this affection.

In the treatment of lead colic, our first object must be to get the bowels to act. This is usually accomplished with difficulty; but it will generally be best effected by administering from three to five grains of the resin of jalap, followed after some hours by full doses of sulphate of magnesia (F. 141). Two or three hours subsequently the patient may be placed in a warm bath, and part of the water injected into the bowels. Should these means fail, an ounce of castor oil may be given; or two or three doses of sulphate of magnesia with sulphuric acid (F. 142). Opium and belladonna will afterwards be necessary to remove all the pain. Opium may, however, be given from the first, and an excellent combination is sulphate of magnesia with ether and opium; or opium alone or with belladonna will overcome the constipation without purgatives. Only farinaceous food ought to be allowed; and the purging should be kept up for a few days by the sulphate of magnesia, administered every morning. As a principle, it is as well not to give calomel in these cases; since it possesses no advantage over simple remedies, and it might happen that the symptoms of the disease would be attributed to the effect of the mercurial. Under no circumstances, however, is calomel admissible save as a purgative; for surely no physician ought to give one mineral poison to a patient who is already suffering from the effects of another.

The application of electricity by induction—Faradization, is sometimes an excellent palliative; affording relief to the pain more speedily than any other remedy. If the practitioner be afraid of the electricity at first intensifying the suffering, the patient can be put under the influence of chloroform. When the attack has been relieved, and the bowels have been freely acted upon, the iodide of potassium should be administered (F. 31); while a hot sulphur bath (F. 125) had also better be ordered. Benefit will be derived from frequently repeating the latter.

XVIII. CONSTIPATION.

Constipation [*Constipo* = to crowd thickly together] is apt to arise during the progress of many acute or chronic diseases, or it may happen as an idiopathic affection. In either case, too much importance is usually attached to its occurrence; and consequently it is often treated with unnecessary activity.

The alvine evacuations, in a properly fed man, amount to 4 or 5 oz. daily (91 lbs. to 114 lbs. in the year). There is some variation in different individuals with regard to the frequency with which the bowels act during health. As a rule, most people have an evacuation every day; but some persons habitually go to stool twice in the twenty-four hours, while others only have an operation every second or third day. The most important consequences which result from habitual costiveness (by which term is meant, a departure from the standard natural to each individual) are irritation of the gastro-intestinal mucous membrane, and perhaps the reabsorption of excrementitious matters. The functions of the stomach, liver, pancreas, intestinal glands, &c., become imperfectly performed. Hence complaint is made of a sense of oppression, mental and bodily: the intellectual faculties are dulled, the complexion gets sallow and pasty, the skin is harsh and dry, the urine is scanty and usually loaded with urates, while such motions as come away are pale and clay-like and very offensive. In obstinate cases the sufferer will possibly lose all power for exertion, he may have frequent attacks of wearisome headache, and dispiriting fits of palpitation of the heart are not uncommon; while more or less severe paroxysms of neuralgia torment him, and he gets hypped or even becomes a confirmed hypochondriac.

The causes of constipation are numerous. It may arise from structural disease of the intestinal coats, *e.g.* tumour, cancer, and the contraction of cicatrices; or from some painful affection of the rectum, such as hæmorrhoids and fissure of the anus; or from debility of the abdominal walls, so that the parietal muscles cease to contract firmly and thus fail to assist the peristaltic movements of the intestines; or from disease of the nervous system; or from the secretions of the liver or pancreas or intestinal glands becoming disordered, or merely deficient in quantity. But of all causes the most frequent is a torpid condition of the colon, leading to insufficient contraction of this gut with the accumulation of fæcal matter. This occurs in old people, in individuals weakened by exhausting disease, in chlorotic females, in the votaries of fashion accustomed to indolent and luxurious habits, in those who neglect to attend to the calls of nature, as well as in such as are engaged in sedentary occupations. In addition to constipation there is defective appetite, slow digestion, a pale sodden tongue indented at its edges, flatulence, fetid breath, a dingy complexion with dark lines under the eyelids, and low spirits. When there is an accumulation of fæces the masses may be felt through the abdominal parietes, unless these walls are loaded with fat. Large collections sometimes take place about the cæcum, in the sigmoid flexure of the colon, and in the rectum. Sometimes the quantity of retained fæcal matter gets so excessive that a large abdominal tumour is formed; which will perhaps give rise to jaundice by its pressure on the biliary duct, or to œdema by impeding the flow of blood through the inferior vena cava. Cases have been observed in which the abdomen has been enormously distended, where a motion has not been passed for ten or twelve weeks, and where the contents of the rectum have had to be scooped away to procure room for the use of enemata. Now and then we hear it urged that an accumulation cannot have taken place, because the patient is tormented with tenesmus, and (as he persists in believing) with diarrhœa. The fact is, however, that when the descending colon and rectum become blocked up, small quantities of fæcal matter may flow through a channel formed in the mass, or they may pass between the substance and the walls of the bowel, and so lead to deception. I have seen several such cases, occurring in delicate females during the period of pregnancy.

In attempting to cure habitual costiveness, the grand aim of the practitioner must be to do away with the use of purgative drugs. This cannot usually be effected at one rude blow; although it is possible at once to substitute simple aperients for the various patent medicines, the mischievous blue pills, and the nauseous black draughts with which the public are so fond of tormenting themselves. The remedies that may for a time be employed, at properly regulated intervals, are castor oil, olive oil, rhubarb and magnesia (the officinal compound rhubarb powder), syrup of senna, sulphate of soda (F. 144, 148), purified ox bile (F. 170), nitric acid and taraxacum (F. 147), Seidlitz powders (F. 169), glycerine, resin of podophyllum with rhubarb or ipecacuanha (F. 30, 160) &c. Small doses of the extract of Barbadoes aloes are often of great service; from half a grain to three grains, in a pill, at dinner, producing a comfortable action in from six to twelve hours. The dose found to be sufficient to insure one stool daily should be persevered with just as long as is deemed necessary, and then gradually diminished. The effect of the aloes is increased by combining it with the extract of nux vomica, with sulphate of zinc, and with pepsine, or with extract of belladonna. On the contrary, the aperient action is lessened by administering it with reduced iron and quinine, or with sulphate of iron. An imitation of the Cheltenham or Carlsbad waters (F. 180, 181) will often prove useful; the Friedrichshall water suits some cases. So too, simple electuaries (F. 194) may be tried; or five or ten grains of liquid tar, formed into pills, and taken every night at bed-time for some weeks sometimes succeed; or frequently it will be much better if the patient can be persuaded to trust to enemata of soapy water, of salt and barley water, or of castor oil (F. 188, 189, 190). A suppository made with sixty or eighty grains of cocoa butter, or the same quantity of soap, can be easily introduced into the rectum, and will generally act quickly. To restore tone to the colon, tonics are invaluable; and hence many of the prescriptions just recommended contain these agents in combination with the purgatives. But after ten or fourteen days the aperient medicines had better be gradually discontinued and tonics alone trusted to; the best drugs of the latter nature being quinine and steel and strychnia (F. 380), quinine and rhubarb and hop (F. 385), sulphate of zinc and nux vomica (F. 409), strychnia and nitro-hydrochloric acid (F. 378), valerianate of zinc and belladonna (F. 410), different preparations of pepsine (F. 420), and cod liver oil (F. 389). With nervous cases a mixture containing the hypophosphite of soda or lime (F. 419), or a solution of phosphorus in cod liver oil (F. 417), taken twice or thrice daily, often acts advantageously; while in those examples of chronic disease attended with suffering, where opium is needed, the constipating effect of this drug may generally be obviated by combining the extract of belladonna with it (F. 340, 344).

None of the foregoing remedies will prove of permanent service unless attention be paid to the diet. It is of the greatest importance that the food be wholesome and digestible; a variety of dishes being only injurious when they lead the patient to eat to excess. Vegetables are often objectionable, more especially if they produce flatulence; while the necessity for them, until the function of digestion is healthily performed, can often be obviated by the use of ripe fruits in the morning. When the latter fail, figs or prunes soaked in olive oil will perhaps succeed. Oatmeal porridge for breakfast is regarded as a specific by some patients; while others look to their pipe or cigar for affording the necessary provocative. Brown bread—that containing the bran, can often be substituted for the fine bread usually consumed; but for the stomach to be able to utilize that outer covering of the wheat, rich in gluten and fatty matter, it must be strong enough to digest it properly. The aërated loaf is generally to be preferred either to brown or the common white bread, since it is certainly more easily assimilated.

Daily exercise in the open air, either on foot or on horseback, stands foremost amongst the remedies for constipation. General indolence, with too much sleep, must be avoided. There are very few cases of costiveness with dyspepsia, arising from sedentary pursuits, that may not be cured by the sufferer retiring to bed at eleven o'clock, and drinking a tumblerful of spring water; rising at seven in the morning and taking a bottle of soda water, then walking for three-quarters of an hour, and afterwards breakfasting upon weak tea with plenty of milk, fat bacon or cold meat, bread, &c. In the hepatic sluggishness of old age, nothing is more beneficial than a daily walk, or even a ride in an open carriage.

There are, in conclusion, two or three suggestions which may be advantageously remembered. Thus, it is very necessary that the different meals should not be hurried, it being important to masticate the food thoroughly. Where the teeth are unsound or deficient, they ought to be replaced by well-made artificial ones.—The bowels can be advantageously solicited to act at a regular hour every day; soon after breakfast being perhaps the best time.—A tepid salt water sponge or shower-bath every morning, followed by friction with coarse towels, gives tone to the alimentary canal.—In some instances, where the liver is congested or the secretion of intestinal mucous deficient, marked benefit arises from wearing the "wet compress" at night; this application merely consisting of two or three folds of thin flannel or calico, wrung out in cold water, laid upon the abdomen, and covered with gutta-percha or a piece of impermeable cloth.—When the abdominal muscles are weak and flabby, and the peristaltic action of the contractile fibre-cells of the intestinal walls is deficient, galvanism proves of great utility.—And lastly, in the cases especially of children and old people, gentle kneading of the abdominal muscles, or friction with some stimulating liniment, will often produce a daily evacuation without any discomfort.

XIX. OBSTRUCTION OF THE BOWELS.

Intestinal obstruction is a fearful disorder which may arise from several conditions. The chief of these are stricture, intussusception, and internal strangulation. Pathologists who like learned words speak of obstruction with fæcal vomiting as *Ileus* [Εἰλέω = I twist or contract]; while the disease is also known as the *Ileac passion*, *Volvulus*, and *Colique de Miséricorde*. The most frequent cause perhaps of an obstruction to the passage of the fæces through a part of the intestinal tube is strangulated hernia; and consequently in every case of obstinate constipation the practitioner should make a careful examination of those parts of the abdomen, thigh, and hip, and (in woman) of the vagina, at which the intestines may protrude.

Pathology, &c.—Dr. Haven has collected, from various sources, the histories of 258 cases of intestinal obstruction; which, without including examples of inguinal and femoral and umbilical hernia, he has thus tabulated:*—

Three divisions of the causes of intestinal obstruction are made, viz:—

1. *Intermural*, or those originating in and implicating the mucous and muscular coats of the intestinal walls:—
    - *a.* Cancerous stricture.
    - *b.* Non-cancerous stricture, comprising—
        1. Contractions of cicatrices following ulceration.
        2. Contractions of walls of intestine from inflammation, non-cancerous deposit, or injury.
    - *c.* Intussusception.
    - *d.* Intussusception associated with polypi.
2. *Extramural*, or those causes acting from without, or affecting the serous covering:—
    - *a.* Bands and adhesions from effusion of lymph.
    - *b.* Twists or displacements.

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* *American Journal of the Medical Sciences*, vol. lvi. Philadelphia, 1855.

c. Diverticula.
d. External tumours or abscesses.
e. Mesocolic and mesenteric hernia.
f. Diaphragmatic hernia.
g. Omental hernia.
h. Obturator hernia.

3. *Intramural*, or obstructions produced by the lodgment of foreign substances :—
    a. Foreign bodies, hardened fæces, concretions having for nuclei gall-stones, &c.

In the first class, the large intestine is affected more than twice as frequently as the small : in the second class, the reverse happens. The average duration of the attack of obstruction is shorter in the first class than in the second : on the whole, the average is about three weeks. Sir Astley Cooper mentions three other causes of obstruction, viz.—hernia at the ischiatic notch, at the foramen Winslowii, and perineal hernia; but none of these causes existed in any of the 258 reported cases.

In 169 examples of intestinal obstruction collected by Mr. Phillips*—63 were instances of invagination or intussusception; 60 of strangulation by the constriction of bands, adhesions, and abnormal openings; 19 were caused by disease of the coats of the bowel; 11 by impaction of hardened fæces, or concretions; and 16 were owing to the pressure of tumours external to the bowel.

When the strangulation is due to *bands* or *twists*, the lower part of the ileum is the most frequent seat of the mischief. There may be only one band, and it may have various attachments in different cases. Most commonly perhaps, it is connected by one or both ends with the mesentery. In some rare instances a portion of bowel has slipped down into the pelvis in front of the pedicle of an ovarian tumour, and has become fatally strangulated.

In *intussusception* (that condition where one part of the bowel is drawn into another portion, just as the finger of a glove can be made to glide within itself) the passage of the gut gets more or less obstructed by the congestion, effusion, and inflammation which result. Most frequently the intussusception is single, though three or four or even ten distinct invaginations have been found in the same subject. The traction is usually from above downwards,—that is to say, the upper segment of the bowel is drawn into the lower. Probably in half the cases, the ileum and cæcum are protruded into the colon, the ileum first passing through the ileo-cæcal valve and then dragging the cæcum with it. This kind of obstruction is most common in young children and in old age; while in addition to the sickness, constipation, tenesmus, sudden violent pain, &c., there is often a discharge of blood and mucus per anum. Sometimes the invaginated ileum comes within reach of the finger in the rectum or even protrudes from the anus. Spontaneous reduction of the invagination may take place; but when it does not happen, inflammation of the peritoneal coats of the involved portion of the bowel usually sets in between the third and seventh days, the opposed surfaces probably becoming adherent in from five to eight days after the commencement of the peritonitis. Where the intussusception does not cause complete obstruction, weeks may elapse without any inflammation occurring. In a considerable number of instances the inflammatory action ends in gangrene, and many inches of the included sphacelated bowel have come away by the rectum, leaving the canal of the gut free; so that a cure will often ensue if care be taken not to disturb the adhesions. From the discovery of intussusception in the dead body it must not always be inferred that this displacement existed during life. Where no symptoms of this state have been presented before death, it is probable that the occurrence has happened subsequently from contraction of the muscular tissue during the rigor mortis.

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* *Medico-Chirurgical Transactions*, vol. xxxi. p. 3. London, 1848.

Intestinal concretions (alvine calculi) are very rarely found in the human intestines, compared with their frequency in large ruminating animals. In man, they are more common in the cæcum and colon than in other portions of the alimentary canal. *Bezoars* consist chiefly of imperfectly crystallized earthy salts and indigestible fibrous matters, arranged in concentric layers round a nucleus—a gall-stone or any foreign body. Other concretions may consist solely of hardened fæces, with the phosphates of lime and magnesia; or of chalk or carbonate of magnesia, where these substances have been largely taken; or of hair, cotton, or paper when a depraved appetite has led to the consumption of either; or of gall-stones with layers of inspissated mucus and fæcal matter. Either kind may gradually increase in size, until there is complete obstruction of the gut. In fortunate cases, concretions have been expelled by vomiting or passed at stool. When situated in the rectum they can be removed by the scoop. If one or more can be felt through the abdominal parietes, producing obstruction, an incision into the intestine has been recommended, all other plans failing. I am not aware that such an operation has been performed.

Compression of the duodenum by enlargement and induration of the head of the pancreas may cause obstruction. The canal of the bowel may thus become entirely closed; partly by the direct pressure and partly by the great congestion and thickening of the coats of the gut set up by the compression.

With regard to *cancerous stricture,* the sigmoid flexure of the colon and the rectum are the parts usually affected. The walls of the bowel need not be infiltrated with cancer in their entire circumference. There is a history of previous suffering. There have been discharges of blood and mucus from the bowels; whilst the fæces have been small and flattened, or reduced to the size of the stem of a tobacco pipe. Moreover, the general symptoms of malignant disease are superadded to the signs of occlusion of the intestinal tube.

Symptoms.—The principal symptoms of obstruction of the bowels are constant vomiting, which is at first simple—consisting of the contents of the stomach and mucus, but which in a few days becomes stercoraceous or fæcal; pain varying in degree, often very severe; gradually increasing tympanites, with violent borborygmi, unless the occlusion be high up; severe hiccup, particularly in strangulation of the upper part of the small intestine; great mental depression; and the pathognomonic symptom—constipation. Very careful palpation will often detect, at an early period, a feeling of increased fulness just above the obstruction. Percussion elicits diminished resonance, more marked at the point at which the intestinal transit is blocked than elsewhere. In almost all instances, the prostration sets in early. Acute peritonitis very commonly occurs in a few days; while gangrene is most frequent in intussusception and obturator hernia. The lower the obstruction is situated the less urgent will be the vomiting. If, for instance, it is in the duodenum, the vomiting will be incessant from the beginning; if in the colon, it may be absent for some time. It might be thought that the illo-cæcal valve would prevent the return of the contents of the colon into the ileum; the preliminary dilatation, however, renders this valve quite patulous. When urine is freely secreted, the obstruction cannot be very high up, since absorption is only partially checked. The urine, however, may be scanty when the seat of occlusion is low down, if there be copious vomitings of fluids; or if there be much fever present.

From the time of Galen the occurrence of fæcal vomiting has been explained on the supposition that it was effected by an antiperistaltic movement of the intestinal canal. Dr. Brinton, however, has shown conclusively that the natural peristaltic action of the bowel above the occluded point is not reversed; but that the intestinal contents are gradually propelled until stopped at the obstructed point. Here they accumulate so as to distend the canal with a liquid mass; and then a double current is formed, one at the surface or periphery of the tube having the direction of the peristalsis itself, and one in its centre or axis having exactly the reverse course.

When the obstruction is in the upper tract of the small intestine, and our treatment fails to remove it, death usually occurs from collapse in a period varying from five to ten days; while occlusion of the colon, from being attended with less pain and distress, and from not interfering so much with the absorption of nutriment, may only prove fatal after several weeks. Moreover, it must be remembered that in cases apparently hopeless, a spontaneous cure sometimes takes place almost at the last moment; so that the more protracted the duration of the disease, the greater the chance of recovery.

Treatment.—In the management of cases of obstruction of the bowels there must be at first a period when the diagnosis can only be doubtful. At this early stage purgatives will certainly be resorted to, though they need never be of a violent or drastic nature. An ounce of castor oil may be given, or two or three grains of resin of jalap, or ten grains of the pill of colocynth and hyoscyamus; though preferably an enema (F. 189, 190, 191) should be tried, the patient being directed to retain it for an hour or two if possible. But directly the practitioner is convinced that there is some mechanical obstruction to the passage of the stools, all remedies of this class ought to be strictly withheld, since they are positively mischievous.

Under these circumstances the increase in the severity of the symptoms is to be retarded by attention to the nourishment of the patient, and by alleviating pain. As regards the first point, it is certain that the more freely food and fluids are partaken of, the greater will be the distension and torment and danger. It is absolutely necessary therefore that the sufferer exercise great self-denial; and that instead of attempting to quench his thirst with copious draughts, he be content to alleviate it by sucking ice and frozen milk, as well as by frequently washing out his mouth with cold water. To support the strength small quantities of extract of beef, or soup thickened with flour and eggs (F. 1, 2, 3, 5), had better be given; a little tea with cream is often refreshing; while iced brandy and water will form the best stimulant. If the vomiting be severe, food by the mouth must be stopped, and nutrient enemata (F. 21) trusted to.—The second indication is to be carried out by a recourse to sedatives. When the suffering is not acute I generally trust to the administration of belladonna and hyoscyamus (gr. $\frac{1}{4}$ of the first to gr. 5 of the last); repeating this pill every three or four or six hours according to the urgency of the symptoms and the way in which the drugs are tolerated. But there are more severe cases where stronger remedies are needed, and then opium is to be administered. This medicine frequently proves invaluable under these circumstances; inasmuch as it relieves or removes pain, checks spasm and contraction, diminishes the peristaltic action of the bowels, and supports life by lessening waste of tissue. Large quantities will usually be needed; while no preparation is better than the officinal extract, given at first in grain doses every four, six, or eight hours. If preferred, however, the subcutaneous injection of morphia and atropine (F. 314) can be tried instead of exhibiting the opium by the mouth. Relief will also be afforded by the free application of belladonna mixed with extract of poppies (F. 297) over the abdomen, together with the assiduous employment of large hot poultices or fomentations.

But it may fairly be inquired,—are there no direct means which can be tried in order to overcome the obstruction? There are two: a surgical operation; and the injection of large quantities of fluid or air into the bowel, with manipulation of the intestines by pressure upon them through the abdominal walls. As regards gastrotomy, the want of success which has attended this operation has been so universal, that many excellent surgeons now consider it unjustifiable. For they argue, that while on the one hand this proceeding has almost always proved fatal, on the other, many desperate cases which have been let alone have ended favourably; recovery setting in just as all hope was being abandoned. Allowing the great force of these objections, it still seems to me that there are a few—possibly quite exceptional—instances where surgical interference may be the means of prolonging life, when all else seems to have failed. Thus, if we can be certain that the occlusion is due to malignant disease or to some tumour in the sigmoid flexure of the colon or rectum, then by opening the colon in the left loin (Amussat's operation) and forming an artificial anus, the surgeon may be the means of relieving much suffering and lengthening life. So also in cases where the obstacle is in the transverse portion of the colon, a similar proceeding can be resorted to in the right loin. Again, if by a careful and searching examination we come to the conclusion that the obstruction is in the small intestine, and is caused by a diverticulum, or by a constricting band of organized lymph round the bowel, it is the duty of the practitioner to perform gastrotomy. Gastrotomy has also been performed successfully for intussusception, the invaginated intestine being withdrawn from the part of the canal into which it had descended. On the contrary, in the case of intramural obstructions, of stricture from the contraction of cicatrices, of obstruction complicated with enteritis or peritonitis, of obstruction from cancer of the small intestine,—in neither of these instances has any operation the least chance of success.

The use of large enemata, with manipulation, remains to be mentioned. And first it must be remarked, that though this proceeding is here spoken of at the end of this section, it is really to be practised at a very early stage, and certainly before there is any fear that the tissues have become gangrenous. Supposing that ordinary injections into the rectum have failed in their object, the patient should be placed on his back, with the pelvis considerably elevated while the shoulders are depressed. A long stomach-pump tube is then to be carefully passed as high as it will go; the anus is to be compressed around the tube by pressure with the hand and napkins; and warm water is to be slowly injected, as much as possible being thrown up until there is distension of the bowel. As the fluid is allowed to come away the surgeon is to press with the flat of his hands upon the abdomen so as to move the coils of the intestine upon one another, and to press them upwards against the diaphragm. This proceeding may be adopted more than once; and in many cases it will be advantageous to have the patient under the influence of chloroform while practising it.—Inflation of the bowel is a hopeful proceeding in the intussusception of children. The air should be slowly injected, until the abdomen is greatly distended; while stimulants ought to be at hand, since the proceeding is apt to give rise to syncope.

Inasmuch as I should never resort to the use of crude mercury in doses of one or two pounds, or of small shot, or of strong tobacco injections, these agents need not be noticed, except to mention that they have each been recommended.

XX. INTESTINAL WORMS.

Helminthology [from Ἕλμίνς = a worm + λόγος = a discourse], or the science which treats of the internal parasites of man and animals, has of late years attracted considerable attention. The number of these different parasites met with in the human subject is rather large (at least thirty-one), for there is scarcely a tissue or organ in the body in which they are not known to lodge and nourish themselves. The classification of the helmintha into those inhabiting the intestinal canal and those residing in other organs is only to be sanctioned on the ground of convenience; for scientifically such a division is imperfect.

There are seven principal entozoa ['Εντὸς = within + ζῶον = an animal] occasionally found inhabiting the human intestinal canal. Of these, four possess an alimentary tube, and are therefore called hollow worms, or *Cœlelmintha* [Κοῖλος = hollow + ἕλμινς]; while there are three which have no abdominal cavity, and are hence termed solid worms, or *Sterelmintha* [Στερεὸς = ἕλμινς].

In the first class we have the following:—

1. The *Tricocephalus dispar*, or long thread-worm, is a small nematode [Νῆμα = a thread + εἶδος = form] helminth, usually found in the cæcum and large intestines. It measures from an inch and a half to two inches in length, and has a very slender body. This parasite is said to be often present in considerable numbers, even in the intestines of healthy persons; and certainly it must be very prevalent in some localities, if M. Davaine's calculation is correct, that half of the inhabitants of Paris are infested by it. During life these worms give rise to no special symptoms.

2. The *Ascaris lumbricoides*, or large round-worm, is found in the small intestines, especially of ill-fed children. This nematode

helminth somewhat resembles in size and appearance the common earth-worm. It varies in length from six to twelve or fourteen inches, is of a light yellow colour, and is unisexual. The female is larger than the male. Although the habitat of this worm is the small intestines, yet it may migrate upwards into the stomach or downwards into the colon; and consequently be vomited in the one case, or evacuated with the stools in the other. Sometimes these worms are very numerous: thus Dr. Hooper has recorded an extraordinary instance in which a girl passed more than two hundred in one week. The symptoms which they give rise to are usually obscure; but there may be thirst, disturbed sleep with grinding of the teeth, moroseness with low spirits, pallid countenance, fetid breath, swelled belly, emaciated extremities, depraved appetite, slimy stools, itching of the nose, tenesmus, and irritation of the anus.

3. The *Oxyuris vermicularis*, or small thread-worm, is found in the rectum, about the sigmoid flexure of the colon, and even in the cæcum and lower end of the ileum. It is the smallest of the intestinal worms, averaging usually about a quarter of an inch in length, while the female is longer than the male. This nematode worm is very frequently met with in children, and is permanently got rid of with great difficulty. It is very rarely found solitary, being generally present in groups or masses. The symptoms produced by these oxyurides are chiefly, intolerable itching and irritation about the anus, tenesmus, depraved appetite, picking of the nose, offensive breath, and disturbed sleep. Exceptionally, more serious results ensue; such as convulsions, chorea, epileptiform attacks, and irritation of the sexual organs leading to other evils.

4. The *Sclerostoma duodenale*, a small nematode worm about the third of an inch long, is unknown in this country. As shown in the remarks on diseases of the duodenum this entozoon is very common in Egypt, its presence in the small intestines of the natives giving rise to severe anæmia. The people of Northern Italy also suffer from it.*

In the second class we find three species:—

1. The *Tænia solium*, or common tapeworm of this country, belongs to the cestode [Κεστός = a girdle + εἶδος] group of helminths. It may occur singly, or there will be some three or four tæniæ. This parasite consists of a number of separate joints,

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* The *Distoma crassum* and the *Distoma heterophyes* (small trematode helminths) have also been discovered in the small intestines. The first variety was once found by Mr. Busk in the duodenum of a Lascar; the second kind was discovered by Dr. Bilharz, of Cairo, in two cases.—Dr. Cobbold has also shown that the common *Ascaris mystax* of the cat may infest the human intestine. This nematode worm is especially characterized by the presence of alaform appendages, one being placed on either side of the head. The male acquires a length of about two inches and a half, whilst the female is nearly twice as long. The cases in which this helminth has been detected in man are only three or four in number.

called proglottides. It exists in the small intestines; while it varies in length from five to fifteen yards, and in breadth from two lines at its narrowest part to four or five at its central or broadest portion. The head of this parasite (or perhaps more properly, its root) is small and flattened; having in its centre a projecting papilla, armed with a double circle of hooks, around which are four suckers or mouths by which the worm attaches itself to the mucous coat of the bowel. The generative apparatus consists of a ramified canal or ovarium containing the ova, and of a minute spermatic duct, both occupying the centre of each joint or segment. This worm is probably nourished by imbibition through its tissues, just as algæ imbibe nourishment from the sea-water in which they float. The researches of Küchenmeister have shown that the Tænia solium is the same parasite as the Cysticercus cellulosæ (pork-measle) of the pig, which is the larval or scolex condition. The symptoms which arise from the presence of the tapeworm are not very striking, its existence being generally unsuspected until single joints are passed in the stools. In certain cases, however, there is a continual craving for food, debility, pain in the stomach, irritability of the bladder, vertigo, noises in the ears, attacks of faintness, restlessness, emaciation, and itching about the nose and anus.

2. The *Tænia mediocanellata* is a cestode worm, with its segments somewhat larger than those of the common tapeworm. It differs from the latter also in other respects, but particularly as regards its head; which, although furnished with large sucking-discs, is destitute of any hook apparatus—is unarmed. The "measles" or cysticerci which produce this helminth are found in the muscles of cattle. According to Dr. Cobbold the hookless tapeworm is as common in this country as the Tænia solium, for which it is generally mistaken. "One may even go so far as to state that, admitting occasional exceptions, the hooked worm infests the poor, and the hookless worm the rich. This circumstance accords with the fact that the lower classes subsist chiefly upon pork, whilst the wealthier prefer mutton, veal, and roast beef."*

3. The *Bothriocephalus latus*, or broad tapeworm, is almost peculiar to the inhabitants of Switzerland, Russia, and Poland. It is the largest cestode helminth ever met with in the human subject; sometimes, according to Dr. Cobbold, attaining a length of more than twenty-five feet, and a breadth of nearly an inch. The extreme fertility of the Bothriocephalus latus may be imagined by considering that each foot of the well-developed worm contains 150 segments or joints, each joint possessing its own ovary and male organs. Hence each joint is fertile; and as each ovary

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* *Entozoa: an Introduction to the Study of Helminthology, with Reference more particularly to the Internal Parasites of Man*, p. 243. London, 1864.

could produce 8000 ova, it may be calculated that ten feet of such a worm might create 12,000,000. These parasites are very rarely met with in this country, but nevertheless they are discovered occasionally. Professor Owen, examining the collection of a worm doctor in Long Acre, found three specimens: two had come from persons who had been in Switzerland, but of the third nothing was known.

Causes.—The eggs and larvæ of the entozoa gain admission into the stomach through the use of raw and underdone animal food, especially pork. They also get introduced with vegetable food,—probably with watercresses, celery, lettuce; possibly with fruit, such as apples and pears; and certainly with impure drinking water. The eggs and embryos of the tænia solium, of the tænia mediocanellata, and of the tænia echinococcus may often be found in pond and ditch and other stagnant waters.

Symptoms.—The most common symptoms produced by intestinal worms are—colicky pains and swelling of the abdomen; picking of the nose; itching of the rectum and fundament; pruritus of the perineum; foulness of the breath; irregularity of the bowels; attacks of headache; grinding of the teeth at night; pallor and slight puffiness of the face; a frequent feeling of malaise; and voracious or impaired appetite. The most conclusive sign is the passage of some of the worms, or of joints of them, in the fæces; and indeed without this, the other symptoms are of little value.

When intestinal worms produce much irritation, the nervous system may become affected by reflex action; and hence convulsions, or epileptic attacks, or fits of hysteria are not unfrequently the result. So also there may be noises in the ears, giddiness, considerable anæmia, and even insanity. Küchenmeister mentions, without confirming the observation, that Dr. Ficinus of Stolberg regards habitual pains in the crown of the head as dependent upon tapeworm. He found this symptom almost always accompanied with this parasite, although only so in women.

Treatment.—We have several remedies for the round and tapeworms, such as the oil of turpentine (F. 183), santonin (F. 185), kousso (F. 184), kamela (F. 182), calomel with scammony or jalap (F. 159), and especially the liquid extract of male fern. I am in the habit of trusting to the latter; which may be employed in full doses even for children three or four years old, and which is to be thus administered. On the first morning the practitioner commences hostilities with a dose of castor oil, aloes, or a Seidlitz powder; while during the day he takes care to keep the patient on very low diet, only allowing a little good beef tea. At night the purgative is repeated, so that the worm or worms get thoroughly uncovered by the removal of the contents of the alimentary canal. Consequently they receive the full benefit of the (to them poisonous) dose of male fern, which is taken the first thing on the following morning, according to F. 187. By this means, perhaps once or twice repeated, there will seldom be any difficulty in removing the whole worm, including the head. To prevent the development of another worm tonics should be given, especially the mineral acids with steel in infusion of quassia. The patients ought likewise to be directed to take plenty of salt with their food; and to have the latter well-cooked.

The oxyurides can generally be killed by enemata of cold water, or of infusion of quassia, or of steel and quassia (F. 192), or of a solution of common salt (F. 188), or of lime water, or of fifteen minims of sulphuric ether in an ounce of water, or of the tincture of the perchloride of iron—in the proportion of half an ounce to half a pint of water for adults. Mercurial purgatives have seemed to me to act beneficially, while sometimes large quantities of the worms have come away after an attack of bilious diarrhœa. Nevertheless, it is often very difficult to effect a thorough cure in the case of patients tormented with the Oxyuris vermicularis. The reason is that the parasites live and breed in the upper part of the colon and cæcum as well as in the rectum. The only effectual way to exterminate them thoroughly is to administer a series of three or four brisk purgatives, which will dislodge them from the upper part of the large intestine and bring them within reach of enemata, which must be persevered with twice a week for several months, while some preparation of steel is given and the aperients are repeated from time to time. Unless this is done the worms may be apparently quite destroyed, and for a time there will be a cessation of annoyance; but again and again they return, until the sufferers or their parents give up all treatment in disgust.

XXI. TRICHINIASIS.

Trichina disease, or Trichiniasis [from Θρὶξ, *τριχὸς* = a hair] is a peculiar febrile helminthic affection, somewhat resembling typhoid fever in its general symptoms, and although the entozoon does not inhabit the alimentary canal exclusively, it may be most appropriately described here since it is introduced in the food, and it is in the intestine that the trichinæ are bred and from which they migrate.

Dr. F. A. Zenker, in the year 1860, first proved the existence of this disease (in the case of a girl who died at Dresden) and showed that it was due to trichinal infection. The small nematode worm which has attracted so much attention since the publication of the striking observations of Dr. Zenker was discovered by Professor Owen, in the year 1835. in a portion of the muscles of a male subject sent to him by Mr. Wormald. A peculiar speckled appearance of the voluntary muscles had attracted the attention of this gentleman; and these specks were found by Mr. Owen—as Tiedemann and Mr. John Hilton had previously shown to be the case in similar instances—to consist of minute encysted entozoa. For this parasite Mr. Owen proposed the name of *Trichina spiralis*, owing to its hair-like and spirally-coiled form. Since this period it has been frequently discovered in the dissecting-room by German and English anatomists; although, prior to 1860, it was regarded as an interesting curiosity, rather than as the cause of a serious disease. If a muscle infested by trichinæ be examined, it will generally be found to present a peppered appearance owing to the presence of small and greyish-white gritty granules. These specks or granules are the round or oval, and more or less calcified, cysts. They contain the immature worm, or worms; and each capsule generally measures the $\frac{1}{50}$ of an inch in its longitudinal direction, and the $\frac{1}{100}$ of an inch in the transverse diameter. The young trichina, when extracted from the cyst, is usually disposed in two, or in two and a half, coils; while on being straightened out it is found to be about the $\frac{1}{30}$ of an inch in length, and the $\frac{1}{700}$ of an inch in diameter (Owen). Trichinæ may, however, exist abundantly in muscular tissue, though only to be recognised by means of the microscope, without any cysts or capsules being present; the latter being only abnormal formations, according to Leuckart. The fully developed and sexually-mature male trichina measures the $\frac{1}{18}$, and the adult female the $\frac{1}{8}$, of an inch (Cobbold); the increased size of the latter being due to the great development of the ovaries and oviducts.

An excellent account of the trichina was published by Leuckart, at Heidelberg, in 1860; and though some of his conclusions have been disputed by subsequent observers, yet generally they are believed to be correct. He sums up the results of his labours in sixteen propositions, which are as follows:—

(1) The trichina spiralis is the juvenile condition of a small nematode worm hitherto unknown, to which the genus name "trichina" has also to be given. (2) The sexually developed trichina inhabits the intestinal canal of numerous warm-blooded animals, particularly of mammals, and of man, and always in great numbers. (3) Already, on the second day after immigration, does the intestinal trichina attain its full sexual maturity. (4) The eggs of the female trichina are developed in the uterus of the mother into filaria-like very minute embryos; which, beginning from the sixth day, are born without any covering derived from the egg. (5) The newly-born trichinæ soon commence a migration. They penetrate the walls of the intestines, and pass through the abdominal cavity directly into the muscles of the animal in which they are bred, where they are developed into the well-known form, provided the conditions are favourable. (6) The direction in which they move is marked out by the intermuscular cellular

tissue. (7) The majority of embryos remain in the group of muscles surrounding the abdominal cavity, particularly the small muscles with much connective tissue. (8) The embryos pierce into the interior of the single primitive muscular fibres, and here they attain within a fortnight the size and organization of the well-known trichina spiralis. (9) The infected muscular fibre loses its original structure soon after the entrance of the parasite. The fibrillæ are transformed into a finely granular matter, while the nuclei of the sarcolemma are metamorphosed into oval nucleated cells. (10) The infected muscular fibre retains its original shape until the young trichina is fully developed, while afterwards its sarcolemma is thickened and contracts from both ends towards the middle. (11) The spot inhabited by the coiled-up parasite is converted into a spindle-shaped dilatation, round which the sarcolemma is thickened and hardened by the deposition of calcareous particles, producing the lemon- egg- or ball-shaped cyst. (12) The migration and development of embryos is also effected by the transfer of pregnant trichinæ into the intestine of a new suitable animal. (13) The development of muscular trichinæ into sexually ripe animals is quite independent of the presence or absence of the calcareous membrane, and begins whenever the former are fully developed. (14) Male and female individuals can already be distinguished in the juvenile state. (15) The immigration of great numbers of young trichinæ causes a very dangerous, and, under circumstances, fatal disease. (16) The mere eating of trichinous flesh may (without immigration of young trichinæ) cause more or less dangerous or even fatal conditions.

The *symptoms* of trichiniasis vary in degree, being mild or severe according as only a few or many of the worms have been swallowed, as well as in proportion to the number of the progeny and the extent of their migrations. Thus, Dr. Althaus remarks that in the epidemic of Burg, near Magdeburg, a woman who had eaten a quantity of raw pork with bread, fell ill and died: her child, who had sucked a spoon used by the mother, suffered slightly and recovered.—According to the accounts given by most authors, the earliest symptoms are loss of appetite and general malaise; to which succeed nausea and retching, prostration, diarrhœa, a sense of thorough indisposition, and a painful stiffness about the neck and arms and legs. This pain is due to the immigration of the young trichinæ into the muscles; and it is accompanied with high fever, and an œdematous swelling about the eyelids and face. The pulse is frequent, and there are copious offensive perspirations; but although the temperature of the body is raised it does not reach the same height as in typhus and typhoid fever. For some days the stiffness of the limbs continues to increase; while all the muscles seem to be painful and swollen and very sensitive to the touch. The movements of the intercostal muscles in respiration are attended with suffering, so that repose is impossible; while there will be troublesome hiccup if the diaphragm be invaded, with hoarseness and loss of voice where the laryngeal muscles get inhabited. Neuralgia of a very severe description, in the cœliac and mesenteric plexuses, has likewise been present in certain cases. When a large quantity of trichinous meat has been eaten, so that the immigration of the trichinæ into the muscles is great, the patient may lie almost paralysed in a state of great exhaustion. The facial œdema generally lasts about a week, its disappearance being followed by swelling of the feet and legs, and ultimately of the trunk. There is no effusion, however, into any of the cavities; nor does the urine become albuminous, although it is always lessened in quantity and may be loaded with urates. About the beginning of the fourth week the patient is in a pitiable condition. The pulse and respirations are very frequent, the tongue is red and dry, the pain is severe, the sweating is profuse, the mouth can scarcely be opened, no sleep can be obtained, and there is great anxiety or delirium ; death not unfrequently occurring with all the symptoms of profound exhaustion. Such complications as pneumonia, peritonitis, and pleurisy with effusion, are not uncommon. In favourable cases, however, the pain and swelling and diarrhœa abate; the oppression of the chest passes off; sleep is obtained; a desire for nourishing food is evinced; the power of the limbs is regained; and there is only left great anæmia, with a falling off of the hair, &c. The parasites have taken up their abode in the muscles, and have fortunately become encysted.

The *diagnosis* of trichiniasis is not difficult, especially if the symptoms come on shortly after very underdone or raw pork, ham, or sausages have been eaten. In the early stages, the trichinæ may be discovered in the stools; but the necessary microscopic examination will often occupy some hours. Subsequently, the worms can be found by taking out a small piece of an affected muscle and minutely examining it. In this way, the fact that the disease has been present may be ascertained long after recovery. Dr. Althaus quotes from Dr. Griepenkerl the following confirmation of this opinion:—From 1859 to 1862, an epidemic occurred in Blankenburg, in the Duchy of Brunswick, which was believed to be of the nature of gastro-rheumatic fever. Some time afterwards, when attention had been directed to the occurrence of trichina disease in other parts of Germany, the similarity of the latter distemper and the epidemic just mentioned, struck the doctors of Blankenburg; and a gentleman who had fallen ill there in 1859, but had recovered after a protracted illness, was informed that he had probably suffered from trichiniasis. He therefore offered to have a small piece of muscle cut out, and the specimen being examined by the microscope revealed no less than seven encysted trichinæ. It was thus shown that the Blankenburg epidemic, in which no less than 278 soldiers and a corresponding number of civilians had been attacked, was in fact the flesh-worm disease.

The results of *treatment* have not been very satisfactory. The cases are not seen in the earliest stage, when emetics and purgatives would do much good; these remedies, however, being comparatively useless after the fourth day from that on which the trichinous food has been consumed. Nevertheless, if diarrhœa and vomiting be absent during the first two or three weeks, it will be advisable to produce purging by full doses of calomel, so as to remove any intestinal trichinæ which may remain. Moreover, where there is diarrhœa, it seems unadvisable to attempt to check it. The sleeplessness and copious sweats were found by Dr. Rupprecht to be best relieved by the wet-sheet packing; the different preparations of opium proving injurious. With regard to any special remedies for destroying the muscular trichinæ, nothing satisfactory is known. The picro-nitrate of potash and benzole are those agents which seem to be the most promising, but further experiments are needed before they can be recommended. The sulphocarbolate of soda might possibly prove useful.

XXII. ULCERATION AND PERFORATION OF THE BOWEL.

Ulceration of the bowel may be a result of muco-enteritis, typhlitis or dysentery in the small or large intestine respectively, and it sometimes occurs in the course of acute diseases, such as variola, typhus, or pneumonia, or near the fatal termination of chronic diseases. In enteric fever ulceration of the solitary glands or more frequently of Peyer's patches constitutes the characteristic lesion, as it does also of tubercular disease of the bowel. In the latter affection the ulcers extend transversely round the intestine, while in enteric fever the long axis is longitudinal. Prolonged irritation and pressure by accumulated pus, an intestinal concretion, gall-stone, or by a foreign body which has been swallowed, again, may give rise to ulceration of the intestinal mucous membrane.

The intestine may be perforated owing to disease in the coats of the bowel, or from the extension of ulceration affecting adjacent organs. The first class of cases has been already treated of. The second division remains to be briefly considered—viz., where the perforation occurs from without inwards.

Hydatid disease and abscess of the liver not unfrequently end by perforating the bowel; when hydatids or pus, as the case may be, will either be vomited or passed away in the stools. The symptoms of hepatic disease, the slow growth of hydatid tumours, the occurrence of local peritonitis, and the character of the discharge, will render the diagnosis of these cases comparatively easy. Then, in the same way, *abscesses of the spleen and kidney* may open into the bowel; although such events are of very rare occurrence.

Calculi from the gall bladder sometimes enter the bowel by direct ulceration through the apposed coats of the reservoir for the bile and the duodenum. This has generally been the case in those instances where an impacted gall-stone has produced obstruction of the bowels, the concretion having originally been too large to pass down the cystic duct.

Ovarian cysts have often emptied themselves by a communication taking place between them and the cæcum, or colon, or rectum. The subsidence of the tumour, together with the passage of the cystic fluid per anum, will point to the true nature of this occurrence.—Many examples of *extra-uterine fœtation* could be referred to, where the sac containing the fœtus has formed a communication with the cavity of the rectum. As the fœtus decomposes, its soft parts and bones are gradually voided with the stools; while with care the mother will gradually recover.* Indeed, one or two rare instances are known in which extra-uterine pregnancy has twice occurred in the same woman, with this same favourable result.—*Ovarian abscess*, as well as *abscess the result of pelvic cellulitis*, may open into the rectum. In both instances *fæcal abscess* almost invariably results, owing to some portion of the contents of the bowel passing into the purulent cyst. The suppurative process is thus kept up: consequently these abscesses burrow in all directions, opening into the bladder, vagina, groin, and perhaps again into the rectum. The wife of a medical man was long under my care with such an abscess; there being at one time three separate openings in the groin from which pus, urine, and liquid fæces used to be discharged. The practitioner may try to effect a cure with strengthening food, tonics, opiates for the mitigation of pain and diarrhœa, cod liver oil, sea air, rest, and carefully adapted pressure; but usually his efforts will fail. The patient either dies from hæmorrhage; or she gradually sinks from exhaustion produced by the purulent discharges, the constant pain, and the general weariness.

In cancer of the uterus it is no very uncommon circumstance for the ulceration to extend through the uterine or vaginal walls into some portion of the bowel which has previously become adherent to the diseased mass. In such cases there is often also a fistulous communication with the bladder, so that the poor woman's sufferings are greatly increased by the constant escape of fæces and urine at the vaginal outlet. The rectum, vagina, and bladder become converted into a single cavity; with such distressing consequences as can be imagined. Fortunately such untoward events as these only occur during the last stage of malignant disease—towards the termination of life; since, beyond giving temporary ease by sedatives, nothing can be done to afford effectual relief.

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* Compare with the Author's *Signs and Diseases of Pregnancy*. Second Edition, p. 284. London, 1867.

Suppuration in the abdominal parietes, the consequence of inflammation excited by falls, blows, &c., often simulates deep-seated disease. The abscess may open externally, or into the peritoneal cavity, or into some part of the intestinal canal. When the purulent collection tends towards the surface the diagnosis is not difficult; but when the matter burrows among the muscles, and is confined beneath the fascia of the abdominal wall, the case is very likely to be mistaken for peritonitis, malignant disease of some internal organ, or for some affection of the cæcum, liver, kidney, spleen, &c. It is important that the true nature of the case should be detected as soon as possible; since all risk is avoided by making an early opening, and so permitting the contents of the abscess to be discharged externally.

XXIII. DISEASES OF THE RECTUM.

The diseases of the terminal portion of the alimentary canal are numerous and important. They often give rise to serious bodily suffering. The sympathy between the uterus and rectum being great, it can hardly be doubted that disease of the latter is at times the cause of barrenness, as well as of symptoms which are erroneously referred to the uterus or ovaries. Affections of the rectum, in almost all instances, cause great mental depression. Indeed, like disorders of the sexual organs, they produce an amount of anxiety greatly disproportionate to their gravity; for it is fortunate that most of them readily yield to well-devised treatment. Although the rectum is some six or eight inches in length, yet the greater number of its diseases may be said to be situated within two inches of the anus. Consequently they are easily detected by a tactile or visual examination, while local remedies can be employed without difficulty.

1. RECTITIS, PROLAPSUS, STRICTURE, &c.

Unless due to violence, or to the presence of some foreign body, simple *inflammation of the rectum* is, I believe, a very uncommon affection. Where it occurs, the local and general suffering it gives rise to are considerable; though with a correct diagnosis relief can soon be given. In former days rectitis may have been more frequently met with; since drastic purges, large doses of aloes or calomel, and the abuse of intoxicating drinks are very likely to provoke it. Moreover, the inflammatory process more rarely extends to the rectum from contiguous parts than might be expected; for during the past twenty years I have very seldom met with such an occurrence, though a large number of severe ovarian, uterine, and vaginal diseases have come under my observation. The chief symptoms of rectitis are a sensation of intense heat around the anus, severe pain shooting up the sacrum and back, spasmodic contraction and excessive sensitiveness of the sphincter ani, tenesmus with the passage of dark-coloured and gelatinous mucus, irritability of the bladder which urinating fails to relieve, and considerable constitutional disturbance. The principal remedies consist of rest in bed, a milk and farinaceous diet, sedative enemata (F. 339), and the repeated use of the hot hip-bath. Where there are dysenteric symptoms, a large dose of ipecacuanha may be administered with the greatest benefit.

The *foreign bodies* met with in this portion of the bowel will be found to consist either of substances which have been swallowed, such as the stones of fruit, fish bones, coins, &c.; of concretions formed in the intestines, having a gall-stone or some mass of indigestible matter as a nucleus; or of articles forced through the anus, such as pieces of wood, soap, syringe-pipes, gallipots, bottles, ferrules, flannel, &c. The ingenuity of the practitioner will often be taxed in the extraction of these bodies; for he must be careful to act as gently as possible, remembering that all the coats of the rectum may be lacerated without great care. Indurated fæces are to be removed with a lithotomy scoop, or with the handle of a strong spoon, if syringing with warm soapy water will not cause their expulsion.

Irritable ulcer of the rectum, or *fissure of the anus*, is apparently a very slight affection, but it gives rise to the greatest suffering. The ulcer is generally superficial, about the eighth of an inch broad, and the third of an inch long; while it is seated immediately within the anus. It may often be exposed by spreading out the anal orifice with a hand over each buttock; but when it cannot be made visible in this manner, a speculum should be employed. The introduction of neither this instrument nor the finger can frequently be borne, however, without the use of chloroform, so intense is the pain which an examination produces. On this account also the ulcer is often a cause of constipation, the patient deferring the act of defecation through fear of the suffering. The fæces in their passage irritate the sore, and produce spasm of the sphincter ani; an acute burning pain resulting which may last for two or three hours after the bowels have acted.

The disease is more common in women than in men; while in the former it not unfrequently gives rise to ovarian or uterine pain, together with irritability of the bladder. Moreover, it may produce such tenderness of the surrounding parts that sexual intercourse cannot be borne.

In attempting to heal the ulcer care must be taken to avoid fretting it by strong aperients, while at the same time the bowels must not be allowed to get confined. Small doses of castor oil, or of extract of belladonna, or of an electuary of senna and taraxacum (F. 194), may be beneficially ordered; or a dinner-pill containing pepsine and the watery extract of aloes (F. 155) is deserving of a fair trial. With regard to local applications I have found none so beneficial as a combination of mercurial ointment (oz. ½) with belladonna (gr. 20); which may be best applied by forming it into sticks, the third of an inch in diameter and an inch and a half in length, with the oil of theobroma (cocoa butter). Astringent applications are seldom of any service; while I would especially caution the practitioner against the use of the nitrate of silver. I have seen this caustic produce such intense suffering, lasting for hours, that I shall never again sanction its employment. The foregoing means failing to effect a cure a slight operation must be performed; which consists in making a longitudinal incision through the centre of the ulcer and the superficial fibres of the sphincter ani, so as to keep the part at rest while the healing process goes on. The bowels should be previously cleared out by a dose of castor oil; and immediately after the operation one or two grains of the extract of opium ought to be administered so as to induce constipation for about three days. An aperient may then be given; while for some time subsequently the motions had better be kept rather soft, a proceeding often best accomplished by the administration of cod liver oil, with small doses of taraxacum. It only remains to add that if there be (as there often is) a little external pile near the fissure, it ought to be snipped off when the ulcer is incised; otherwise the latter will not heal. Moreover, any derangement of the general health which may be present must be attended to. Another method of treatment much followed in France is forcible stretching of the anus by means of the two thumbs.

Chronic ulceration of the rectum, with thickening of its coats, arises as one of the secondary effects of syphilis. It may also be due to the deposit of tubercle, the ulceration not going on to perforation of the coats of the bowel; or it may simply be owing to a depressed state of the general health. The ulceration is to be cured by treating the cause of the morbid action, by rest in the recumbent position, and by the employment of anodyne suppositories.

An intractable *rodent ulcer* has been met with at the margin of the anus, the sore gradually creeping up the rectum. Excision, or at least complete destruction with potential caustics, ought to be had recourse to. Where an operation is impracticable, an ointment of sulphate of zinc (F. 294), steel with arsenic (F. 381, 399), and cod liver oil are the remedies to trust to. *Chancres* are also sometimes found in the same situation.

Stricture of the rectum may arise as a consequence of ulceration or from chronic inflammation of the mucous membrane and submucous connective tissue. It is far more common in women than men, and a large proportion of the cases are of venereal origin, resulting from soft chancres about the anus spreading to this part from the vulva, or communicated by discharges, and extending into the rectum. By some the ulcerations are considered to be due to constitutional syphilis. One case has come under my observation in which the disease was attributed to a very lingering labour; and certainly the pressure of the fœtal head, perhaps for three or four days, would seem likely to set up inflammatory action. The stricture may be limited to a ring of condensed tissue, when it is said to be of the annular form; or it may be confined to one side of the bowel, as when it follows the healing of an ulcer; or almost the whole of the gut may be narrowed and indurated. In the King's College museum there is a preparation showing great thickening of the entire walls of the rectum, the hypertrophy being such, that the passage is greatly contracted. Above the stricture the bowel is usually somewhat dilated. In the majority of cases the constriction is within two inches of the anus, so that it is readily reached by the finger; but now and then it is placed higher up, and even at the juncture of the sigmoid flexure of the colon with the rectum, when the careful use of the bougie will be needed to detect it. The disease is essentially chronic, the contraction increasing slowly. It produces constipation, small stools, great difficulty in voiding solid motions, straining and bearing-down efforts, pain in the loins and sacrum, mental depression, flatulence, and a mucous discharge. After a time the mucous membrane may ulcerate; the ulceration giving rise to a burning pain in the bowel, with occasional discharges of blood. This form of stricture must not be confounded with simple spasmodic contraction of the canal, such as may at times arise when the part is irritated by hæmorrhoids, ulcer of the anus, &c. It must also be carefully distinguished from constriction due to malignant disease. Fibrous tumours of the uterus, when they fill the pelvic cavity, compress the rectum and prevent the passage of solid fæces; so that without an examination an erroneous diagnosis might be made.

The treatment required for the cure of stricture is troublesome and tedious. In some instances dilatation by bougies suffices, if care be taken to pass an instrument occasionally for several months after an apparent cure, and indeed until all traces of indurated tissue have become absorbed. Where the contraction is great, a sponge-tent (F. 426) may be employed at first, bougies being subsequently used. For the relief of a callous annular stricture it will perhaps be advisable to make four or five slight notches in different parts of the ring, with a straight probe-pointed bistoury; afterwards plugging the part with oiled lint, and at the end of a few days beginning the use of bougies. In all cases the motions should be kept soft by sufficient doses of a simple electuary (F. 194). To relieve pain, suppositories of opium and belladonna (F. 340) answer better than any other remedies.

There are two forms of *prolapsus of the rectum.* In one, the most common, there is protrusion of only the mucous membrane: in the other, all the coats of the bowel are prolapsed. This disease is not unfrequently met with in children, especially in such as are badly nourished or have a strumous taint. Want of tone in the sphincter ani, constipation, straining at stool, prolonged diarrhœa, the irritation of worms, disease of the urinary organs, stone in the bladder, &c., are its chief causes. The size of the protrusion varies. There may be only a fold of mucous membrane forced down, or the inverted bowel will perhaps be prolapsed to the extent of five or six inches. Moreover, at first, the protrusion occurs only when the bowels act; but after a time the descent may follow any exertion, such as standing, coughing, &c., so that there is almost constant prolapsus. In the latter cases the intestinal mucous membrane gets indurated, and occasionally ulcerated; the sphincter ani becomes exceedingly flaccid, and the surrounding tissues relaxed; while there is a general sense of weight and distress about the body, with pain, which is greatly aggravated on attempts at defecation.

In the treatment of these cases we have to reduce the prolapsus, and to prevent its return by removing the cause. The replacement is seldom attended with difficulty, though a little patience may be needed. In some children directly the bowel is returned it is forced down, and this happens again and again; but the tendency to protrusion can generally be overcome, for the time, by making pressure with a pad of lint and then drawing the buttocks rather firmly together with a broad strip of adhesive plaster. The general health must always be attended to; plain nourishing food being allowed, with bark or steel or cod liver oil as may be necessary. Care is also to be taken that the secretions are natural and that the bowels act regularly; small doses of mercury and chalk, of taraxacum, of magnesia, or of cream of tartar often acting beneficially. After each evacuation the bowel is to be immediately replaced, the anus well sponged with cold water, and an astringent injection thrown up. The latter may consist of a little alum and decoction of oak-bark (gr. 10 to fl. oz. iij.), or of the tincture of perchloride of iron and water (min. xx.—xl. to fl. oz. iij.). Occasionally a suppository made with from five to twenty grains of tannic acid and thirty of cocoa butter, has seemed to me much more efficacious than the astringent enemata. Care is also to be taken that the seat of the water closet is a proper distance from the ground—neither too high nor too low. With regard to young children too, it is often advantageous to make them pass their motions in a recumbent posture, so as to prevent violent straining, and at bedtime rather than in the morning.

When medical treatment does not succeed, recourse must be had to a surgical operation. Different proceedings have been recommended, but in bad cases they are all, with one exception, very apt to fail. Thus, I have known instances where either the nitrate of silver, nitric acid, potassa fusa, or the actual cautery, has been applied to the mucous membrane so as to produce superficial sloughs; and this treatment proving useless, two or three folds of mucous membrane and skin at the margin of the anus have been excised. In one instance the surgeon had even cut out a portion of the sphincter muscle, with the effect of somewhat constricting the anal orifice; but a few weeks after the operation the bowel came down as badly as before. The really most efficacious plan is that proposed by the late Mr. Copeland; which consists in taking up several small folds of the mucous membrane at different points of the prolapsed bowel with the forceps, and very tightly ligaturing their bases. The ends of the ligatures are then to be cut off, the intestine returned, and a dose of opium administered. The patient keeps in bed for some days, while the ligatures come away; and he must not be surprised should the bowel afterwards descend occasionally, as it may do so until the several ulcers have contracted and healed. I have found this simple proceeding act very favourably in females, without inducing any bad after-consequences. It is apt to be followed by retention of urine, but the catheter will only have to be used for a day or two.

Polypus of the rectum is more common in children than in adults. The pedunculated growth arises from the mucous membrane, and it may be either soft or follicular, or firm and fibrous. The chief symptoms are uneasiness about the fundament, a frequent desire to go to stool, and a mucous discharge which is more or less mixed with blood. The growth generally descends when the bowels act, and has to be replaced. Sometimes a polypus becomes the cause of intussusception, dragging down the part of the bowel from which it arises into the part below, and this having occurred may afterwards be increased. I have only met with some three or four examples of rectal polypi in women and children, and in these cases I have removed the growth with a blunt pair of scissors. But

I think, as a rule, that it may probably be safer to apply a ligature and then to cut off the tumour below it; since if hæmorrhage did happen in any instance there would certainly be a difficulty in checking it.

A *villous tumour*, very similar to that which occurs in the bladder, has in a very few instances been found growing from the mucous membrane of the rectum. Such a growth may attain the size of a cricket-ball, and when extruded from the bowel will look like a foul cauliflower mass. Its pedicle may be narrow, or the attachment to the side of the gut at times consists of a broad base. These tumours give rise to bearing-down pains at stool, and purulent discharges; but they are chiefly remarkable for their excessive vascularity, and consequently for their tendency to bleed. In the four or five cases which have been recorded, a permanent cure seems to have resulted from the removal of the tumour by ligature. On subsequently examining the mass, immersed in water, it is seen to present innumerable papillary projections, which branch out in a dichotomous manner.

The functional affections of the rectum give rise to as much mental and bodily suffering as the diseases attended with change of structure. *Simple neuralgia* of this part may persist for many weeks, without altogether subsiding for a day. The passage of the motions aggravates the pain; and though there may be a frequent desire to go to stool, yet little or no fæcal matter follows many of the attempts at evacuation, since there is usually troublesome constipation. In some cases the patient points to one spot as the seat of a fixed pain; though on an examination no breach of surface can be detected. The treatment consists in improving the general health by nourishing food, with pepsine (F. 420) to aid digestion, if needful; in administering quinine or zinc, steel, and cod liver oil; in keeping up a regular action of the bowels by simple enemata (F. 188); and in relieving the perverted or augmented sensibility by suppositories of opium and belladonna (F. 340).

An irritable sphincter muscle causes symptoms somewhat resembling those due to an ulcer, but of less severity. There is pain in defecation; while if the finger be introduced into the bowel the muscle will grip it tightly, the sphincter being felt like a firm and hard ring. Nervous women seem most liable to this spasmodic affection, often suffering from it rather severely during the time that the catamenia are on. A cure may generally be effected by improving the nervous tone, by using mild laxatives, by employing an ointment of belladonna and iodide of potassium (F. 307) around the anus, and by the occasional passage of a bougie.

The opposite condition to the foregoing, or *atony of the rectum*, may arise with a healthy or a morbid condition of the sphincter.

The impaired power of the muscular coat of the bowel deprives the patient of the force necessary to completely expel the stools; so that the fæces frequently accumulate until there is great distension. Complaint is made of constipation, tenesmus, a sense of weight and fulness, and often of forcing pains. On making an examination a hard mass of fæcal matter will be felt blocking up the bowel; which mass will have to be removed by the scoop. The re-accumulation may be best prevented by tonics containing zinc and extract of nux vomica (F. 409). If any aperient be needed, one or two grains of the extract of Barbadoes aloes, with the same quantity of quinine, should be taken at dinner.

Pruritus of the anus is a troublesome affection not uncommonly met with in patients suffering from hæmorrhoids, dyspepsia, or intestinal worms—particularly the oxyuris vermicularis. Old people often complain of it; while it also afflicts many women towards the end of pregnancy, or such as have uterine disease, or those who have recently got over "the change of life." The itching is aggravated by warmth; it is worse at night than at other times, and it often prevents sleep. The friction resorted to for relief causes the tissues about the anus to become thickened and furrowed.

The treatment which will be found most successful consists in the use of cold bathing or sponging; daily exercise in the open air; a diet free from seasoned dishes, coffee, and all kinds of alcoholic stimulants; and a cool bedroom, with a mattress instead of the enervating feather bed. A regular action of the bowels is to be maintained; and hence it may be necessary to order an electuary of sulphur and taraxacum (F. 194), or small doses of rhubarb and blue pill (F. 171), or simple enemata (F. 188). The best local remedies are tobacco water (F. 265), or a lotion of corrosive sublimate and prussic acid (F. 263), or a wash of borax with morphia and glycerine (F. 268), or the application of a piece of lint dipped in the liquid extract of opium, or the use of the vapour of chloroform. In obstinate cases the physician will have to administer arsenic with some bitter infusion (F. 52), or iodide of iron and sarsaparilla (F. 32), or tar pills or capsules (F. 36). An examination should always be made so as to detect, and subsequently to remove, any local cause which may be present; and more especially to make sure that the irritation is not due to the presence of pediculi.

The rectum and anus, like other organs of the body, may be absent or malformed. These *congenital imperfections* have been well described by Mr. Curling, Mr. Ashton, and many French and German authors; but the most complete account of them is to be found in the excellent work of Dr. Bodenhamer.* They are but rarely met with. Thus, at the Dublin Lying-in Hospital, during the seven years' mastership of Dr. Collins, there were born 16,654 children, in only one of whom was there an impervious condition of the gut. And again, at the same institution 13,933 children were born during the seven years commencing November, 1847, out of which number three had imperforate anus and one an occluded rectum (Drs. Johnson and Sinclair). In some cases the child is born with every appearance of healthy conformation; but in others the defect is at once appreciable. Hence, the accoucheur should always be careful, in examining the new born infant before it is dressed, to see that the anal aperture appears well-formed.

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* *A Practical Treatise on the Ætiology, Pathology, and Treatment of the Congenital Malformations of the Rectum and Anus.* New York, 1860.

The chief varieties of these congenital vices of conformation, are the following:—

1. *Preternatural narrowness of the anus.* In most cases the contraction can be overcome with small sponge-tents and bougies. If, however, the symptoms are urgent and the contraction very great, the aperture should be enlarged by making three or four notches with a probe-pointed bistoury. A tent of oiled lint must be introduced, and subsequently the orifice ought to be kept sufficiently dilated with bougies.
2. *The anus imperforate with the rectum normal.* There is either a persistence of the membranous septum of fœtal life, or a prolongation of skin over the aperture of the bowel. In either case, the meconium distends the part and therefore marks the site for an operation. This consists in making a crucial incision, removing the angles of the flaps, and subsequently introducing a bougie every day until the parts are healed. Where the septum appears to be thin, a puncture with the bistoury might suffice.
3. *The anus entirely absent with partial or complete non-development of the rectum.* An incision may be made at the site of the normal situation of the anus, and if the bowel be reached it is to be gently drawn down, opened, and its edges secured to the margins of the external wound. If, after penetrating to the depth of an inch, the gut cannot be detected, the practitioner should wait a few hours; since the rectum will perhaps be forced down as it gets distended with meconium and is no longer kept back by resisting tissues. When these attempts to reach the bowel fail, colotomy in the left groin, or less preferably in the left loin, is the only resource.
4. *The anus absent, but having its office fulfilled by a preternatural opening in an abnormal situation.* Frequently no interference is required in early life. Subsequently, the patient may be anxious for an attempt to be made to procure an outlet for the fæces at the natural site, but any operation for this

purpose is attended with danger. Sometimes the unnatural orifice is in the vagina, in the male urethra, &c.

5. *The anus normal and opening into a cul-de-sac; from the upper part of which extends the rectum contracted to the size of a small cord, or having its walls thickened and firmly glued together, or being entirely absent.* The diagnosis is very difficult, and always uncertain. Colotomy in the left loin will generally be found the only available resource.
6. *Anus, rectum, and colon absent.* In some of these cases there has been an opening in the abdominal walls, or in the loins, communicating with the cæcum or with the small intestines.

2. FISTULA IN ANO.

An abscess not unfrequently forms in the loose areolar tissue around the rectum, either as the result of local irritation or of some constitutional affection. It may be deep-seated, the pus quickly increasing in quantity, and having a tendency to burrow backwards; this form being accompanied by severe throbbing pain, and considerable disturbance of the system. The superficial abscess gives rise to much less suffering, is small, and soon points externally. The treatment of either variety consists in the application of poultices, rest in bed, and in letting out the pus immediately fluctuation can be detected. After this evacuation the part may thoroughly heal, and complete recovery follow. But more frequently, owing to the constant action of the sphincter and levator ani muscles, the wound merely contracts, a fistulous passage by the side of the rectum resulting.

There are two forms of fistula,—one *complete,* in which a probe can be introduced from the external orifice upwards into the bowel; and the other a *blind external fistula,* where the mucous coat of the rectum is not perforated. The external aperture in either kind is often small, and not easily detected; it is generally placed near the anus, but sometimes is one or two inches distant; and it may be concealed in a furrow, or can be found in the centre of a little button-like eminence. The complete fistula is much the most common; while it proves the most annoying, inasmuch as flatus and intestinal mucus and fluid fæcal matter pass along its track, giving rise to great discomfort as well as to painful spasmodic contractions of the sphincter. The irritation of these foreign matters occasionally produces recurrent attacks of inflammation and suppuration; so that the sinus, instead of remaining simple, has one or more tracks branching from it. Fistula in ano often co-exists with phthisis, being probably due to tubercular inflammation of a portion of the rectum, followed by ulceration and perforation. Suppuration is set up in the connective tissue by the irritation of feculent fluid; and in a short time the abscess bursts externally, the opening and sinus subsequently remaining patent.

Some few fistulæ will heal kindly when attention is paid to the general health, when the parts are frequently bathed with tepid or cold water, and when some astringent lotion (F. 264) is daily injected along the sinus. But, in the majority of cases, a cure can only be effected by dividing the tissues which intervene between the external and internal opening, including the fibres of the sphincter ani. The performance of this operation is not forbidden by the presence of tubercle in the lungs, provided the pulmonary disease be neither far advanced nor running a rapid course. As a rule, I always recommend a consumptive patient who is improving under treatment and gaining weight, to allow the beneficial action of remedies to be as little interfered with as possible; and I regard an anal fistula as one of those complications which can only exert an injurious influence, while the operation required for its cure may be said to be simple and harmless.

3. HÆMORRHOIDS.

The tumours known as hæmorrhoids [Αἷμα = blood + ῥέω = to flow], or piles, are divided into two varieties,—the *external*, or those situated outside the sphincter muscle; and the *internal*, or those within it. In many cases the two kinds are found coexistent. They are rarely met with until adult age, and are generally believed to be more common in women than in men. As sedentary occupations tend to produce them, this opinion is probably well-founded. Amongst their other causes may be mentioned pregnancy, abdominal tumours, habitual constipation, and all diseases that retard the return of blood from the rectum; also the frequent use of drastic purgatives, which tend to produce congestion of the bowel; together with a torpid action of the liver, disorders of the urinary organs, straining to pass hardened fæces, over-rich living, insufficient exercise, an hereditary tendency, and a long residence in tropical climates.

External hæmorrhoids consist either of a knot of varicose veins, or of one or more cutaneous excrescences. In the first case, the veins may contain fluid blood; but more frequently their contents have coagulated, so that we find one or several tense and purple and teasing swellings. Generally speaking these sanguineous tumours are due to the rupture of one of the hæmorrhoidal veins, with the formation of a very delicate cyst round the extravasated clot. The presence of this cyst is best made out by soaking it in water; when the contents will be found to remain unchanged, the little currant-like clot not diminishing in size. When such piles are painful, great relief can be afforded by incising them and squeezing out the clots. With regard to the cutaneous excrescences, they consist chiefly of hypertrophied skin and connective tissue. They are seldom single, while not unfrequently there is a more or less prominent ring of them at the margin of the anus.

The treatment of external piles is directed either to the mitigation of the heat and tingling and discomfort, or to the complete removal of the tumours. Generally, the latter can only be effected by excising the growths with a pair of curved scissors; allowing the wound to heal in the ordinary manner. The operation is seldom followed by much bleeding: yet if any artery be seen pumping out blood it should be secured. Moreover, the integument at the base of the pile must not be cut too freely, or troublesome contraction of the anus will follow upon the completion of cicatrization. But in very many instances great, if not permanent, relief may be given by more simple measures. First, by regulating the bowels, taking care that a daily evacuation is produced without any straining or irritation. This may easily be done by administering some aperient confection (F. 194); or by giving a dinner-pill containing the extract of Barbadoes aloes, with a little pepsine or nux vomica (F. 155, 175); or by the use of simple enemata (F. 188). Then, the anus should be thoroughly sponged with cold water every night and morning, as well as after each action of the bowels; while if the tissues be relaxed and indolent, some tannic acid, or alum, or solution of subacetate of lead, can advantageously be added to the water. The application of the ointment of galls and opium often affords comfort. The diet ought to be regulated, plain nourishing food being allowed; but alcoholic stimulants, coffee, and highly seasoned dishes had better be interdicted. Plenty of walking exercise is also important. Supposing that the piles are inflamed, the morbid action may be controlled by hot bathing and the use of poultices; or very often the application of ice acts more speedily and effectually. And, lastly, if the tumour be swollen and sensitive, the evacuation of the contained clot, as before mentioned, is the plan to pursue. Although this proceeding is very simple, yet the patient should keep the recumbent posture for some hours afterwards to avoid all risk of hæmorrhage.

Internal hæmorrhoids are of three kinds. Most frequently we find them in the form of spongy vascular growths, having a red granular appearance, and a soft elastic texture like that of erectile tissue. A second variety is made up of the lower branches of the plexus of hæmorrhoidal veins, which branches are dilated and often plugged with coagula. While a third kind consists of pendulous tumours, composed of fibro-areolar tissue.

Internal piles are either single or multiple. They protrude during defecation; but in time, as the sphincter becomes dilated from their pressure and relaxed by the attacks of hæmorrhage, they are found to be constantly down save when the patient is in the recumbent posture. Where they only appear externally at the time the bowels are moved, they especially require to be replaced directly after the stool; since if this precaution be neglected, they are apt to become congested and inflamed owing to the constriction of the sphincter. The bleeding varies from a mere tinging of the evacuations, to the escape of many ounces; and though the blood is occasionally venous, yet much more commonly it is arterial. Sometimes the flow seems to take place periodically, in which case it may serve to relieve congestion of internal organs—particularly of the liver. When it is remembered that hæmorrhoids are symptomatic of disordered digestion, hepatic congestion, or of some disease interfering with the circulation,—and that they produce constant uneasiness, irritability of the bladder, an annoying muco-purulent discharge, with frequent losses of blood,—it is not surprising that patients afflicted with them become thin and low-spirited, sallow and anæmic.

In the treatment of internal as of external piles it is of great importance to remove and prevent congestion of the abdominal viscera, to insure a healthy action of the bowels, and to look carefully to the general health. Sometimes the injection of half a pint of cold water every morning proves useful; while some astringent (matico, tannic acid, alum, or tincture of perchloride of iron) may be added to it, if there be hæmorrhage. When the patient is unable to replace the protruded piles, the practitioner must do so for him; first pucturing them freely, if they are painful and swollen. In a few instances, where there has been delay in seeking advice, the amount of constriction has been such, that strangulation and mortification have occurred; so that nothing could be done but poultice the tumours until they have sloughed off, while the suffering has been relieved by full doses of opium.

A radical cure must be made in those cases where the piles are large and painful and bleed freely, and where the constitution is suffering from them. This may be effected by cauterization, excision, or the ligature. Prior to either operation any derangement of the liver which may be present ought to be relieved; while the bowels are to be thoroughly cleared out with a dose of podophyllin or calomel, followed by castor oil.

Cauterization only acts favourably if the growths are small, vascular, and florid. The tumours being well protruded, every part of their surface is to be painted either with nitric acid, the acid solution of nitrate of mercury, or with potassa fusa; taking great care to avoid touching the skin, and afterwards oiling the parts well before replacing them. The eschar usually separates in a few days; while provided the contraction produced by the inflammation and cicatrization be sufficient, a second application of the caustic will be uncalled for.

Excision is a very effectual proceeding, and possesses many advantages; though it is open to the great objection of being often followed by dangerous hæmorrhage. To remedy this, some surgeons have employed the écraseur; but the chain of this instrument can seldom be adjusted without difficulty, hæmorrhage has followed its use, and in some cases anal stricture has subsequently occurred owing to undue contraction of the cicatrix. With the same object of preventing hæmorrhage Mr. Henry Smith has invented a clamp (an improvement on the instruments previously used), by which the base of the tumour can be held and compressed for a few minutes, while the free portion of the tumour is excised. The divided surface being carefully dried, strong nitric acid or the actual cautery is applied; and the parts being oiled the clamp is taken off, and the patient put to bed where he remains for two or three days.

The operation by *ligature* is that commonly practised; for though the cure is rather tedious yet it is certain, while it can be accomplished without much pain or any danger. As regards the latter point it is simply sufficient to say, that Mr. James R. Lane has performed this operation in 427 cases with two deaths. The ligatures are applied in this manner:—The pile being well forced out (by the use of a warm water lavement, if necessary), the surgeon draws it down with a pair of pronged forceps, makes a deep groove with the scissors at its base, and then encircles it tightly and securely with a ligature of waxed twine. If the tumour be large, it is better to tie it in two portions by means of a double ligature passed through its base with a curved needle. The operation is to be repeated on all the piles separately, so that each may be fairly strangulated. After tightening the ligatures the bulk of the piles can be cut off, and the parts replaced within the sphincter. Any redundant masses of skin at the verge of the anus had better be then snipped off. A full dose of opium should be subsequently given, ice may be applied if there be much pain, constipation is to be maintained until about the fourth morning, and the patient ought to be kept in the recumbent posture until the ligatures come away on the sixth or seventh day. In a very few instances tetanus has followed upon this operation, which should therefore be postponed if cases of this fatal disease have been at the time at all more frequent than usual after other surgical proceedings. Examples of erysipelas and pyæmia have very rarely been met with.

4. CANCER OF THE RECTUM.

Malignant disease in this situation may be of the scirrhous, medullary, or colloid form. The early symptoms are not well-marked, little suffering arising until a difficulty is experienced in passing the stools. Consequently, when the practitioner is consulted the coats of the bowel are generally found extensively infiltrated with cancer, producing considerable contraction. Severe lancinating pains are then complained of, the nights are almost sleepless, and there are frequent attacks of hæmorrhage; while there is an abundant offensive and purulent discharge, together with considerable debility and loss of flesh. If the disease be situated at the upper part of the rectum, it may escape detection unless the examination be carefully made; but in most cases by the time advice is sought the growth has extended downwards within easy reach of the finger, and then the gut has also become firmly fixed. In women, as ulceration goes on, a communication is often effected between the vagina and rectum.

The *treatment* consists in palliating the severe suffering which is always produced, sooner or later by this affection. The bowels must not be allowed to get blocked up, and yet opium in some form is absolutely necessary. In many instances, however, the constipating effect of this drug will be overcome by combining the extract of belladonna with it, as is done in F. 339, 340, 343. So also the hypodermic employment of morphia and atropine (F. 314) is less frequently productive of constipation, than the exhibition of the morphia salt alone by the mouth. Indian hemp, aconite, chloroform, and ether may all be useful in various combinations (F. 315, 317, 330, and 337). In this disease, as well as in stricture of the rectum, obstinate constipation, &c., a tolerably regular action of the bowels can oftentimes be maintained by injecting into the rectum five or six ounces of linseed or olive oil, gently warmed by standing the bottle in hot water. The oil must be retained to be really efficient. At the end of some twenty-four or even forty-eight hours it will produce a soft motion, this effect being repeated daily for perhaps a week. Then when the constipation recurs, the oil is to be employed again. Where there is such a rare occurrence as almost complete closure of the bowel by the disease, before the powers of life have become much deteriorated, existence may be prolonged for a few months, sometimes with comparative freedom from suffering, by making an artificial anus in the left loin.

Epithelial cancer sometimes attacks the anus, and may extend up the rectum. In a remarkable instance which had resisted the application of potential caustics, and which had returned after the performance of excision by Prof. Siebold, Mr. Curling repeated the latter operation. This gentleman took care to cut wide of the affected tissue, while he removed nearly the whole of the sphincter muscle on the right side. When I last heard of the case seven years had gone by since the operation, without any relapse: though for the last of these years there had been a tumour of a doubtful nature high up in the pelvis.*

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* *Observations on the Diseases of the Rectum.* Third Edition, p. 154. London, 1863.

PART IX.

DISEASES OF THE LIVER.

The liver, situated chiefly in the right hypochondriac and epigastric regions, is the largest gland in the human body; measuring some twelve inches in its transverse diameter, and about seven in its antero-posterior. Its weight in healthy adults is generally allowed to be from 2 to 4 lbs. avoirdupois; though remarkable differences are to be found in the statements of authors on this head. According to calculations made by Dr. Frerichs from some eight hundred observations, the actual weight varies from 1·8 to 4·6 lbs. avoird.; the relative weight fluctuating between the one-twenty-fourth and one-fortieth of that of the body. The liver is increased in size during the progress of digestion; partly because there is a greater afflux of blood to it at this time, and partly owing to the deposit of amorphous matter in the hepatic cells.

The following vessels are found in the liver,—large and numerous lymphatics, biliary ducts, together with branches of the portal vein and of the hepatic artery and of the hepatic veins. The branches of the biliary ducts converge into two large trunks (one from the right and one from the left lobe) which leave the liver at the transverse fissure; these trunks by their union constituting the hepatic duct. The latter then joins with the cystic duct, forming the ductus communis choledochus; this channel opening into the descending portion of the duodenum by an orifice common to it and the pancreatic duct. The portal vein and hepatic artery are the afferent, while the bile ducts and hepatic veins form the efferent vessels. The portal vein carries to the gland the blood from which bile is to be secreted; while by the hepatic artery aërated blood is supplied for the nutrition of the capsule, for the coats of the ducts and bloodvessels, as well as for the other parts of the organ. The bile ducts take away the biliary secretion which has been separated or manufactured by the hepatic cells from the portal blood; while by the hepatic veins the residue of blood is returned into the general circulation through the inferior vena cava.

The four operations conducted by the liver, as well as the nature of the bile, have already been noticed (vol. i. p. 150). It only remains, therefore, to add that the secretion of bile (the most significant function of this gland) is *increased* by rich abundant food, spices, and alcoholic drinks; by indolence and heat. Conversely, it is *diminished* by a light diet, with the avoidance of all alcoholic fluids; by exercise and early rising; by residence in a temperate climate. Mercury, podophyllin, taraxacum, and rhubarb; the chloride of ammonium; the mineral acids, and benzoic acid are supposed with more or less reason to excite, iodide and bromide of potassium, the preparations of opium, and carbonate of soda taken while digestion is going on, to repress the secretion.

The diseases which lead to *enlargement of the liver* are congestion, hypertrophy, inflammation and abscess; fatty degeneration, and particularly lardaceous or amyloid disease; various new formations, but especially hydatid tumours and cancer. *Hepatic enlargement is simulated* in cases of spinal curvature; in congenital malformations and transpositions of the gland; by displacement downwards from the continued use of badly-made stays, or stays habitually laced too tight around the lower part of the chest; by diseases of the thoracic viscera (*e.g.* pleurisy with effusion, dropsy of the pericardium, and intra-thoracic tumours) causing depression of the diaphragm with enlargement of the chest at the expense of the abdomen; by abscess of the diaphragm, as well as in those rare cases where this muscle becomes the seat of tumour or cancer; and lastly, in diseases of the abdominal viscera, when the liver and other organs are pushed upwards so as to lessen the size of the thorax.

Diminution of the liver takes place in cirrhosis, acute atrophy, and in those diseases of the gland or of distant organs which lead to chronic atrophy.

I. CONGESTION OF THE LIVER.

The hepatic circulation is affected by so many different agencies, that hyperæmia, congestion, or the undue accumulation of blood in the capillary vessels of the liver is a morbid state frequently met with. Moreover, it is the initiative step in almost all the structural diseases of this organ.

The simplest form of this condition is that which results from some obstruction to the circulation of the blood through the hepatic and the portal veins—*passive congestion*. Examples of this variety are met with in cases of valvular affections of the heart, as in instances of mitral obstruction and mitral insufficiency, and more particularly where there is incompetence of the tricuspid valves; in those morbid states of the lungs which impede the passage of the blood through the pulmonary artery, such as emphysema, collapse, &c.; as well as in the diseases that diminish the size of the thoracic cavity. Violent exercise, particularly if taken soon after meals, gives rise to temporary engorgement of the liver; and to this may be due that stitch in the side which compels the sufferer to rest for a few minutes. Under the influence of congestion the liver is found after death enlarged in every direction, with its capsule tightened or distended, and its parenchyma rendered tough. On making a section of the gland, dark red patches may be seen, consisting of the gorged hepatic veins; around which are lighter-coloured parts corresponding to the delicate branches of the portal vein.

During life, obstructive hyperæmia of the liver is attended with headache and a disinclination for exertion; frequent flushings of the face, with coldness of the extremities; and muscular pains about the loins and limbs. Complaint is made of a sense of constriction and weight in the right hypochondrium; and there will often be slight jaundice, nausea, giddiness, and dyspepsia. The urine is scanty, high-coloured, sometimes loaded with urates, while it frequently contains bile-pigment with traces of albumen; the bowels moreover are confined; the colon is distended with offensive flatus, and the hæmorrhoidal veins probably become enlarged. In all forms of hepatic sickness there is so frequently an aggravated attack of retching between 4 and 6 o'clock A.M. that this occurrence may almost be regarded as a pathognomonic symptom. With aged people there are at times attacks of delirium with sleeplessness. During health, percussion affords a dull sound from the sixth right rib down to the costal margin; whereas, in the state under consideration the area of the dulness becomes much more extended. Palpation, too, will detect the increase in size. Moreover, when any pulmonary or cardiac affection has been the first step in the production of the hepatic congestion, there will be all the symptoms of such primary disease; which also often subsequently ends by producing general dropsy, &c.

Our treatment can only be palliative. In the early stages saline purgatives (F. 141, 143, 150, 152) act favourably by causing a drain from the portal system, and frequently very great relief is afforded by a mild mercurial aperient given every two or three days. At a later period, these must be combined with the employment of a mineral acid, or of ammonia, ether, &c. (F. 147, 161, 162). Benzoate of ammonia (F. 40) is serviceable if the urine be deficient in quantity or in acidity. Where the heart or lung affection which gives rise to the hepatic congestion is not far advanced the careful use of the sulphur springs of Harrogate (F. 466), the waters of Carlsbad (F. 496), or those of Kissingen (F. 493), or of Marienbad (F. 497), will frequently afford considerable relief.

Passive congestion usually leads to a diminished excretion of bile; the secreting cells remaining active, but the passage of the bile from the lobules and through the small gall ducts being delayed, owing to the compression which is exerted by the loaded bloodvessels. The ducts consequently become gorged with bile—*biliary congestion.* The same condition necessarily results from obstruction of the common excretory duct of the liver and gall bladder. Supposing this congestion to be kept up for any length of time, the cells of the gorged lobules get impaired and their power of reproduction diminished; since not only is their nutrition interfered with, but they become atrophied when their functions are not duly called into play, just as all tissues do.

In *active congestion* serious structural changes arise in proportion to the intensity of the hyperæmia, and the frequency of its recurrence. This state is brought about by causes which increase the functional activity of the gland. The chief of these are,—the presence of morbid matters in the blood, and especially of malarial poison; the suppression of habitual discharges, such as a hæmorrhoidal flux, or of the catamenia at the critical period of life; a long residence in hot climates, particularly in marshy districts; deranged nervous influence, examples of which may be seen in hyperæmia from mental excitement; and probably atony of the bloodvessels, owing to disease of their coats. As has already been remarked, the liver always contains more blood, and its secreting cells are more active during the process of digestion, than at other times: hence excessive eating and drinking, irritating articles of food, alcoholic drinks, &c., must unduly stimulate this gland; excesses of this kind are particularly liable to induce hepatic congestion in hot climates. The symptoms induced resemble those set up by passive congestion; save that they are somewhat less severe, and only of short duration. Strong healthy individuals, residents in a temperate climate, and who take plenty of active exercise, may counteract the evil effects which flow from a too rich and abundant diet; while those of sedentary habits who pamper themselves, are sure to suffer. The cure of these cases is to be effected by the removal of the cause. Great benefit will be derived from the use of horse-exercise, hunting and shooting, daily walking, &c.; from the employment of laxatives containing rhubarb, aloes, and sulphate of soda, &c. (F. 144, 145, 148, 172); from recourse being had, when necessary, to the mineral acids (F. 377, 378); and especially from the disuse of beer and ardent spirits, with the adoption of a simple diet, consisting partly of fish, poultry, rice, fresh vegetables, light claret, soda water, and tea.

Extravasated masses of blood (*apoplexy of the liver*) are now and then found in the hepatic tissue or beneath its capsule, as the result of great congestion induced generally by morbid changes in the blood. These cases of hæmorrhage may be met with in scurvy, in purpura, in ichorhæmia, and especially in the malarious fevers of tropical climates. The extravasations are often numerous; while the blood will be found in masses varying in size from that of a pea to that of a hen's egg, or it may be infiltrated through the parenchyma converting the tissue into a pulpy mass. The effusions are probably directly due to some disease of the coats of the vessels—such as fatty degeneration, leading to rupture.

The effusion of serum into the substance of the liver (*hepatic œdema*) is said by Dr. W. Thomson* to have been often observed, uncombined with marks of acute inflammation. It cannot be a common condition, however, since very few authorities make any mention of it. In a case of fatal remittent fever reported by Dr. Morehead, the liver was found of a dark olive colour, reaching two inches below the right ribs, and touching the point of the eighth left rib. It weighed 4 lbs. 4 ozs.; while on cutting and pressing it, six ounces of serum freely oozed from the surfaces. The parenchyma broke down readily under the finger; and the incised surfaces presented a dark olive colour, with brown intermixture, but not the mottled redness of congestion.

II. HYPERTROPHY OF THE LIVER.

Hypertrophy of the liver is characterized by an increase in the secreting cells, causing enlargement of the entire gland. There is no growth foreign to the natural structure to be found in the organ, but simply an excess of the normal tissue.

The hepatic cells may be either increased in size or multiplied in number; while in proportion to the increase the volume of the liver will become enlarged, perhaps to more than double its natural bulk. This hypertrophy not uncommonly arises from long-continued congestion, such as is met with among the residents of tropical climates or of malarious districts; while it can likewise occur in consequence of disease in other parts of the system. Thus, it has been sometimes found in leucocythemia, in phthisis, in dysentery, and in saccharine diabetes. Partial hypertrophy may be of a compensatory nature; that is to say, a portion of the gland having been rendered comparatively useless by disease, the healthy part has its cells enlarged so as to prevent systemic derangement.

The functions of the liver are seldom interfered with in true hypertrophy. But its correct diagnosis is important lest active remedies should be improperly used. If any good can be effected in these cases it is only by regulating the diet, and enjoining residence in a temperate latitude.

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* *A System of Practical Medicine*, vol. iv. p. 180. Edited by Alexander Tweedie, M.D., &c. London, 1840.

III. INFLAMMATION OF THE LIVER.

The inflammatory diseases of the liver, though often met with in temperate climates, are particularly common in tropical regions. In describing them, I shall speak first of hepatitis—or inflammation of the substance of the gland, or of the peritoneal investment of the liver, or of both combined: secondly, of cirrhosis, or that slow form of inflammatory action which affects the areolar or connective tissue: thirdly, of syphilitic hepatitis: and fourthly, of the diseases of the bloodvessels. The subject of inflammation of the gall-bladder and bile-ducts will be considered subsequently.

1. HEPATITIS.

The term hepatitis [from Ἧπαρ = the liver; terminal *-itis*] seems better than that of suppurative inflammation as proposed by Dr. Budd, inasmuch as the morbid action does not necessarily end in suppuration and abscess. However, the name is not very important, provided the nature of the affection be generally understood.

Causes.—Europeans residing in tropical climates, who live too freely, are liable to suffer from hepatitis. Excessive eating and indulgence in alcoholic drinks, and continued exposure to external heat, are the most general causes; or it may occur from exposure to a chilling wind while heated: not uncommonly it is associated with dysentery, and it has been attributed by Dr. Budd to transmission of morbid products from the inflamed mucous membrane of the large intestine, but it may arise quite independently of dysentery. The morbid action may be induced by some mechanical injury; though it is seldom that this is a cause. The disease is now and then due to ichorhæmia from suppurative inflammation of the portal vein, or of the veins of the systemic circulation. Ulceration of the intestines, of the stomach, of the gall-bladder or gall-ducts, are all causes of suppurative hepatitis; and perhaps a hot climate alone, by deranging the functions of the gland, may give rise to it. So again, marsh fevers will originate it. Spirit-drinking often produces adhesive inflammation and induration of the liver (cirrhosis); but not the suppurative form.

Pathology and Morbid Anatomy.—In a few cases the coats of the liver and the capsule of Glisson become inflamed (*Perihepatitis*), without the tissue of the gland being implicated to any extent. Perihepatitis may be a part of general peritonitis; occasionally it is the result of an extension of pleuritic inflammation on the right side; or it will ensue from disease in the liver itself, such as abscess, hydatid cyst, and cancer. Suppuration rarely follows: while the other results are very seldom serious unless the coats of the portal or hepatic veins get attacked, the inflammation generally soon terminating in resolution. Sometimes opacity and thickness of the capsule remain, together with adhesions between the apposed surfaces of the peritoneum.

Far more commonly, however, the substance of the liver is the seat of the inflammation. In a few instances the morbid action is diffusely extended over the whole organ (*Hepatitis diffusa parenchymatosa*); a form which may lead to softening and acute atrophy, or to general induration. The inflammation, however, is more frequently circumscribed (*Hepatitis vera circumscripta, suppuratoria*); and then abscess is a common result. The series of changes which take place in inflammation of the liver, as this disease is usually met with, have been so clearly described by Dr. Morehead, that I shall give a condensed account of that which he has sketched from actual observation.* In the first stage of parenchymatous hepatitis there is vascular turgescence; and could the gland be examined, the pathologist would find the structure redder and softer than natural, while blood would ooze freely from it when cut. At this period the inflammation often terminates in resolution; but if it proceed, then interstitial exudation of coagulable lymph soon follows in different parts of the organ, inflammation of the entire substance being very rare. When the lymph maintains the liquid form in which it is exuded, there is hope of complete recovery by reabsorption and resolution. Supposing, however, that it coagulates in the interstices of the parenchyma, then one of three conditions must ensue:—Either the liquid portion will be absorbed, and the solid lymph become organized into fibrous tissue; or the exuded lymph instead of undergoing organization, may re-liquefy, be absorbed, and disappear; or the lymph degenerates into pus, the tissues where it has been deposited soften and melt down, while the whole gets more or less circumscribed by membrane of low organization,—in short, hepatic abscess has formed. Then, more lymph exudes from the inner surface of the investing membrane, undergoes certain changes, and is converted into pus; the sac becomes distended, the bulk of the liver is increased, and tumefaction takes place; adhesion of apposed serous surfaces follows; and the circumscribing wall becoming thin on one side by the liquefying process, pointing and rupture succeed. This is just what happens in the case of an ordinary phlegmonous abscess; in which the central parts of the lymph (those most remote from the living tissues) change into pus, while the peripheral portions (those adjacent to the living structure) get organized into membrane. In the liver the abscesses are seldom single, though sometimes several small ones coalesce. They may also be superficial, or deep-seated; but most frequently they are of the latter kind, and have their seat in the right lobe. Granting that diffuse suppuration of the liver is just possible, this occurrence must be very rare; since Dr. Morehead asserts that he has no knowledge of it.

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* *Clinical Researches on Disease in India.* Second Edition, pp. 327 to 330. London, 1860.

Symptoms.—At the onset there is tenderness over the gland, which will always be most marked when the peritoneal investment is affected. Then, as the morbid action progresses, we find high fever, with a hot skin and great thirst and scanty urine; the fever sometimes assuming a typhoid character. There is also fulness of the right hypochondrium from enlargement of the gland, with increased dulness on gentle percussion; more or less severe pain in the region of the liver, aggravated on pressure or deep inspiration or coughing; and an inability to lie on the left side. Moreover, there will be occasionally a yellow tinge of the conjunctivæ, but rarely complete jaundice. More or less dyspnœa, sympathetic cough and vomiting, and troublesome hiccup are generally present. The fever, pain, tenderness about the liver, and general disturbance, are often greater in this capsular inflammation than when the glandular structure is the seat of mischief. Where the pain is of a sharp lancinating character, it is supposed to indicate inflammation of the serous and fibrous coverings of the gland; where dull and tensive, the parenchyma is the part affected. Again, where the convex surface of the organ is the seat of the inflammation, the chest symptoms will predominate; where the concave, the stomach derangements will be the most marked. It is well known that in hepatic affections, the right collar bone and shoulder become the seats of gnawing and aching sympathetic pains; while sometimes also (probably when the left lobe of the liver suffers) pain is referred to the left shoulder. According to Annesley, pain in the right shoulder is a sure indication that the disease is in the right lobe. Andral has noticed that in some instances the only pain has been in the head; and this has been sufficiently intense, constant, and long continued to attract exclusively the patient's attention.

The formation of hepatic abscess is chiefly signalized by the occurrence of chills—perhaps of unmistakeable rigors, of hectic fever, gastric disturbance, pain or tenderness, and tension of the abdominal muscles on palpation; with a feeling of weight in the region of the liver, and a dry cough. The physical signs of enlargement of the gland will be present; and a distinct tumour may perhaps be made out. While the hectic fever increases, the patient emaciates: there is progressive prostration, and either diarrhœa or dysentery sets in. In many instances, however, the disease runs a more insidious course; there may be only lassitude and extreme disinclination to exertion with loss of appetite; an occasional feeling of chilliness and a sense of discomfort or uneasiness about the liver, acute symptoms only setting in as an abscess approaches the surface. A few remarkable cases have occurred, where the symptoms during life have been so obscure that suppuration has not been suspected; and yet a large abscess has been found on post-mortem examination, or even several collections of pus.

Terminations.—The most favourable termination of hepatitis is of course by resolution. Where this happens the pain and fever gradually abate, and the patient is soon well. The inflammation may, however, as has already been shown, be so severe and extensive as to lead to diffused suppuration; although much more frequently it ends in the formation of circumscribed abscesses, or possibly in gangrene.

Abscesses of the liver not uncommonly attain a considerable size; and, in extreme cases, have contained several pints of pus. The prognosis is always unfavourable. Now and then hepatic abscesses will possibly undergo a spontaneous cure, in consequence of absorption of the liquor puris and degeneration of the pus corpuscles. Such abscesses have burst into the peritoneum, and given rise to fatal peritonitis. In a few instances they appear to have opened into the biliary ducts, so that their contents have passed into the duodenum. Most frequently, however, when the matter gets near the surface of the gland, adhesive inflammation is set up in the portion of peritoneum immediately above it, and lymph is poured out, which glues the organ to adjacent parts—to the abdominal parietes, the diaphragm, stomach, or some part of the intestines; the pus being then discharged externally by a direct opening through the walls of the belly, or indirectly through the lung or stomach or colon, &c., or it may reach the pleural cavity or pericardium, proving rapidly fatal. Recovery is not uncommon when the pus makes its exit through the lung, it is rare when the abscess points on the surface of the abdomen, the most favourable spot for an external opening being the epigastrium.

Very rarely the inflammation terminates in gangrene, or gangrene will follow suppuration. In one of the patients of the Dreadnought Hospital Ship, mortification appeared to be the result of opening an abscess.

Treatment.—Various observers have recognised that the strength of the patient requires to be supported in this disease, rather than to be lowered by bleeding and the administration of mercury. The latter remedy is, however, still used very indiscriminately; and Dr. Abercrombie's observation remains true, that mercury is employed "with very undefined notions as to a certain specific influence which it is believed to exert over all the morbid conditions of this organ. If the liver is supposed to be in a state of torpor, mercury is given to excite it; and if it is in a state of acute inflammation, mercury is given to moderate the circulation, and reduce its action."* But it may be laid down as a general rule that neither the abstraction of blood, nor the production of salivation, will exert any favourable influence in hepatitis. And further, experience seems to prove that every kind of active treatment is contra-indicated; while it ought especially to be avoided when we infer that suppuration has taken place.

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* *Pathological and Practical Researches on Diseases of the Stomach, &c.*, p. 360. Edinburgh, 1828.

Purgatives, in the early stages of those cases not preceded by dysentery, appear to be useful by increasing the circulation through the portal capillaries, and thus diminishing congestion in the capillaries of the hepatic artery. If there be a suspicion of portal stagnation—as will be indicated by a yellow-coated tongue, scanty alvine discharges, a diminished secretion of urine, and a dingy state of the skin—then Dr. Morehead advises the employment of small doses of blue pill with ipecacuanha, or of the extract of taraxacum and an alkali, together with the external application of nitro-hydrochloric acid by means of a compress. Dr. Maclean speaks confidently of the good effects of ipecacuanha given as in dysentery, whether this complication be present or not, in doses of 20 or 25 grains every six or eight hours. Small doses of tartar emetic, $\frac{1}{4}$ grain with 15 grains of nitrate of potash every half hour, have been found efficacious in acute cases. Emetics have been recommended in the early stages; but though they promote the discharge of bile, yet the compression exerted on the liver by the abdominal muscles during vomiting may prove very unfavourable. Moreover, when nausea and vomiting have been set up by antimony or ipecacuanha, it is often difficult to subdue the irritability of the stomach; especially as the disease itself has a tendency to produce sickness. Sedatives will usually be indispensable, and there is no objection to the best agent of the class, viz., opium. Where dysentery is present, it must be checked by ipecacuanha, morphia, and astringents, according to the directions given at p. 137. In all cases at the onset, it will be necessary to restrict the diet; while the patient must be confined to the recumbent posture, and fomentations and poultices should be assiduously applied.

When the inflammation has gone on to the formation of pus, good nourishing food, with tonics (such as quinine and iron, the nitro-hydrochloric acid and bark) will be required. Where there is restlessness and pain, these symptoms should be subdued by opium; the bowels must be regulated by rhubarb, or by rhubarb and aloes; and wine ought to be allowed in proportion to the weakness of the patient. If an abscess approaches the surface and adhesion to the parietes appears to have taken place, it has generally been recommended (after an exploratory puncture) to open it with the knife, or what is perhaps better, puncture it with a trocar. It is doubtful, however, whether this should be done, and great judgment and caution will have to be exercised; while on no account are mere exploratory punctures to be made in search of doubtful purulent collections. Even where the diagnosis is clear, Dr. Budd seems on the whole to be in favour of allowing the abscess to burst of itself. And I suppose that Mr. Waring is of the same opinion; for in the summary which this gentleman has published of eighty-one cases operated on, there are sixty-six deaths with only fifteen recoveries, and he fears that even this proportion appears too favourable owing to the non-publication of unsuccessful cases. Much greater success, however, appears to attend evacuation of the abscess by means of the aspirator or exhausting syringe, and this method should be first tried in all cases in which it is considered desirable to procure an escape for the pus. Adhesion to the abdominal walls is not absolutely necessary for this proceeding. The sac may be afterwards washed out with a dilute solution of carbolic acid or iodine.

2. CIRRHOSIS.

Induration of the liver, or cirrhosis [from Κιῤῥὸς=yellowish], consists of chronic inflammation and hypertrophy of the connective tissue which pervades and covers the liver.

Causes.—The most common cause of cirrhosis is spirit-drinking; a circumstance which has led English practitioners to call this disease the *gin-drinker's* liver. When alcohol has been introduced into the system in the ordinary way by the stomach it speedily passes to the liver, and analyses show that a greater proportion of it is present in the liver and nervous system than in any other organs of the body.

It is worthy of notice, that the alcohol consumed in wine and beer is not as destructive as that taken in the form of ardent spirits. Dr. Paris explains this by supposing that in the first case the alcohol is not only more intimately mixed with water, but that it exists in combination with its extractive matter; and consequently that it is incapable of exerting its full effects before it becomes altered in its properties, or, in other words, partially destroyed. A hot climate increases all the vicious effects of alcohol.

Pathology and Morbid Anatomy.—Interstitial hepatitis comes on gradually. At first exudation takes place into the connective tissue of the portal canals and interlobular framework, and the gland is enlarged. As the exudation becomes organized into fibrous tissue there results a diminution in the calibre of the branches of the portal vein, as well as of the hepatic artery and duct. From this strangulation of the vessels atrophy of the lobular structure of the liver ensues; the hepatic cells undergoing fatty or granular degeneration, or becoming completely destroyed in parts of the gland. The liver becomes abnormally firm and subsequently irregularly contracted, the surface being uneven. According to Dr. Lionel Beale cirrhosis is the result of primary atrophy and not of an inflammatory process, the fibroid tissue between the lobules consisting of the remains of vessels and ducts which have collapsed in consequence of atrophy of the hepatic cells which filled their meshes. The diminished flow of the blood through the portal vein favours congestion of the capillaries of the gastric and intestinal mucous membrane, whence arise hæmorrhages; whilst it also produces engorgement of the capillaries of the peritoneum, and hence ascites results. The cirrhosed liver is much smaller than normal, weighing only 1½ or 2 lbs. It is pale and the surface is extremely irregular, presenting numerous projections which give the organ a "hob-nailed" appearance.

On slicing the gland, it is found hard and tough; while the firm and thickened connective tissue is seen to form thin lines between irregular masses of lobules. At the parts on the surface corresponding to these lines, the capsule is drawn in, the tissue of the liver is also paler than natural, owing to the presence of the broad lines of greyish-coloured tissue, and it is often yellowish from an accumulation of biliary matter in the cells. Hence, a section of the liver has the greyish-yellow colour of impure beeswax; and this disease has, in consequence, been termed by the French, *cirrhosis*.*

Symptoms.—These are generally few and obscure until the effused fibrin begins to interfere with the flow of the portal blood, and to offer an impediment to the secretion and escape of bile. Slight enlargement of the liver is present in the early stages; but as the fibrous tissue contracts and the lobules atrophy, the size of the gland becomes diminished, while the spleen gets hypertrophied. Then weight or dull pain in the right hypochondrium, indigestion, flatulence and constipation, occasional feverishness, a dry and rough skin, with an unhealthy sallow look, are the most prominent symptoms. When relief has been obtained by the use of purgatives and an abstemious diet, the patient probably fancies himself well, and pursues his usual occupations; although at the same time he finds that he gets gradually weaker and thinner, and that his complexion remains sallow. After a time there are attacks of diarrhœa, the appetite fails, the urine gets scanty and is loaded with lithates, while the emaciation and debility increase.

At the end of some months, or not until the lapse of one or two years, the increasing contraction of the effused lymph greatly obstructs the circulation through the portal vessels: an exudation of serum takes place from the extreme branches of the veins converging to form the vena portæ; and hence the belly becomes enlarged by dropsical effusion, which gradually increases so as to cause great distension. The veins on the surface of the abdomen get dilated—showing that the current of the portal blood is seriously impeded; and occasionally hæmorrhage from the distended portal system gives rise to an effusion of dark blood into the stomach and intestines. In a few rare instances the attack of hæmorrhage has constituted almost the first symptom of cirrhosis; so that death may really happen from this cause, if the loss of blood be very great, in the midst of apparent health. When ascites has once occurred, it continues and increases, while in some twelve months or so the patient dies from exhaustion. Or a fatal termination will perhaps occur at an earlier period owing to pneumonia, peritonitis, jaundice and toxæmia, diarrhœa, or some other complication.

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* See the works of Morehead and Budd, already quoted from.

Treatment.—Although confirmed cirrhosis is quite incurable, yet it is probable that when the disease is early submitted to treatment its progress can be at least much retarded. At the commencement we shall do considerable good by insisting upon the complete disuse of all alcoholic drinks, by forbidding the employment of coffee and curry and highly seasoned dishes, by supporting the strength with plain animal food, and by checking any complications as they arise. With regard to medicines, it will probably be found that aperients are always needed. Perhaps the most useful are the sulphate of magnesia (F. 141), or the sulphate of soda (F. 143), or the resin of podophyllum (F. 160), or the acid tartrate of potash, with taraxacum (F. 194). An imitation of the Carlsbad waters (F. 181) has often seemed to me to act favourably; and consequently this mixture can be recommended where the patient is unable to drink the real waters at their source (F. 496), or to pay a visit to Marienbad (F. 497). Some authorities recommend cupping or the application of leeches over the liver. Where it is evident that the loss of blood cannot be borne, repeated small blisters may be employed; and considering that gin-drinkers are the last class of people likely to derive benefit from bleeding, it would seem better to have recourse to counter-irritants rather than to active depletion. Supposing there is a well-founded suspicion of any syphilitic taint in the system, iodide of potassium (F. 31) will probably do great good; following up its effects by quinine and the iodide of iron (F. 382), or especially by the waters of Kreuznach (F. 484), or perhaps of Aix-la-Chapelle (F. 483), or of Neuenahr (F. 485).

Where it is evident that the degeneration of the hepatic cells has become far advanced, then active aperients and mineral waters only increase the prostration and tend to hasten the setting-in of dropsy. Attention must then be more directed to the condition of the digestive organs; aiding their action by the nitro-hydrochloric acid (F. 378), or by pepsine and extract of nux vomica (F. 420), or by tincture of rhubarb in some bitter infusion (F. 369). Inunction over the liver with the iodine (or the red iodide of mercury) ointment may sometimes appear to do good. Supposing there be hæmorrhage, such astringents as turpentine (F. 102), gallic acid (F. 103), or nitric acid (F. 104) will be most likely to check it; very cold drinks being also allowed, while a bladder of ice should be occasionally placed over the abdomen. When ascites has taken place, mild diuretics, purgatives, tonics, and sedatives are the agents with which we may hope to palliate the suffering and to prolong life for a short time. But if there be urgent dyspnœa or other general distress from the dropsy, the fluid ought to be removed by tapping; a proceeding, however, which does not afford satisfactory results, since the serous effusion is sure to reaccumulate in a week or two.

3. SYPHILITIC HEPATITIS.

Syphilitic inflammation of the liver is generally accompanied with other tertiary symptoms of the venereal infection. The disease manifests itself, according to Dr. Frerichs,* in three forms:—(1) As simple interstitial hepatitis and perihepatitis. (2) As hepatitis gummosa; in which white depressions, like cicatrices, are found to contain yellowish nodules of a rounded form and dried appearance, varying in size from that of a linseed to that of a bean. And (3) as waxy, amyloid, or lardaceous degeneration, to be considered in a subsequent section. All three forms will perhaps be found coexisting in the same liver, or either may be present independently of the others.

The symptoms produced by the first two varieties are seldom very striking; for while one portion of the gland is being rendered unfit to perform its functions, other parts become hypertrophied and take on extra work. The diagnosis, however, is made somewhat easy by the presence of the syphilitic cachexia, and the other indications of constitutional infection. The spleen is also generally found enlarged in these cases. Sometimes there is albuminuria.

The remedies consist of iodide of potassium (F. 31), the mercurial vapour bath (F. 131), and rest from all mental or bodily labour. Where there are symptoms of renal disease, the iodide of iron (F. 32) had better be alone trusted to.

IV. DISEASES OF THE HEPATIC BLOODVESSELS.

The *hepatic artery* and its branches may be involved in disease affecting the liver generally,—as in cirrhosis, cancer, tubercle, &c.; or this vessel will be the sole seat of morbid action, as is seen in atheroma of its coats, aneurismal dilatation, and obstruction of its canal. In many instances it is impossible during life to do more than guess at the exact nature of the affection. As regards aneurism of the hepatic artery the chief indications are,—the presence of a pulsating tumour, pain from irritation of the hepatic plexus of nerves, and jaundice from the compression exerted on the biliary ducts. Generally, death takes place suddenly from rupture and internal hæmorrhage.

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* *A Clinical Treatise on Diseases of the Liver.* Vol. ii. p. 152. Translated by Dr. Murchison for the New Sydenham Society. London, 1861.

The *portal vein* is now and then affected in different ways. Blood-coagula are at times found obstructing its channel; being formed under the same circumstances as those which give rise to thrombi in other parts, or from some disease confined to the liver and interfering with the circulation through it. As a general rule, these clots are the cause, not the result, of inflammation of the venous coats. The obstruction for the most part comes on some time after disease (cirrhosis, chronic atrophy, chronic peritonitis, &c.) has given obvious proof of its presence. The abdominal veins get prominent and dilated, there is diarrhœa with rapid wasting, the spleen becomes perceptibly enlarged, and a large quantity of ascitic fluid is rapidly poured out. The more sudden and complete the obstruction, the less time there is for the collateral circulation to be established; and consequently the more marked will be the effects. The fatal termination can sometimes be postponed by the use of astringents to check the diarrhœa and hæmorrhage, by employing food which will be easily assimilated, and by the operation of tapping. The latter proceeding, however, is not to be resorted to until absolutely necessary.

The portal vein collects the venous blood from the digestive organs, and carries it to the liver. Inflammation, ulceration, or suppuration of the viscera in which the roots of this vein have their origin, is most frequently the cause of suppurative disease of the vein itself. This affection may also, however, have its source in inflammation of the bile ducts, especially where the latter morbid process is due to gall-stones. The prominent features of suppurative portal phlebitis are headache, violent fever, great prostration, rigors, profuse sweating, pains in the epigastrium or the right hypochondrium, bilious diarrhœa, enlargement of the liver and spleen, and jaundice. These effects are followed frequently by the symptoms of peritonitis, and occasionally by metastatic purulent deposits in the liver or lungs, or joints; while they terminate in fatal exhaustion or coma. Remedies are of little avail; though quinine and opium may be employed to subdue the rigors and pain, while the patient's strength is supported by milk and raw eggs, solution of beef (F. 2), and demulcent drinks (F. 19).

With regard to adhesive inflammation of the portal vein but little is known. For frequently this condition cannot be distinguished from the other inflammatory diseases of the liver during life; while as it is not fatal like the suppurative form, recent examinations have not been made. The changes found after death, and which show that it has at one time existed, consist of certain linear fissures over the obliterated branches; together with atrophy of those lobules which are naturally supplied by them.

Rupture of the portal vein, the result of fatty degeneration of its coats, has been met with; so have ossification and calcification; while more commonly some of the branches have been found dilated, in consequence of the obstruction of others.

The *hepatic veins* commence in the capillaries of the vena portæ, the three large branches which result opening into the inferior vena cava. These veins are generally found enlarged after death from valvular disease of the heart. They are very rarely the seat of adhesive inflammation; but when they are so, the morbid action gives rise to thickening of the coats, or to obstruction of the affected branches. Suppurative hepatic phlebitis is rather more common, occurring as the consequence of abscess of the liver. Blood poisoning generally ensues.

V. SUPPRESSION OF THE FUNCTIONS OF THE LIVER.

The secretion of the bile may be more or less completely suspended [*Acholia*, from Ἀ = priv. + χολή = bile] owing to acute atrophy, as well as from cirrhosis, fatty degeneration, &c. This subject has already (vol. i. p. 150) been generally treated of; but its importance is such that it requires further consideration.

1. ACUTE ATROPHY OF THE LIVER.

Acute or yellow atrophy of the liver (sometimes spoken of as *acute wasting*, *softening of the liver*, *diffused hepatitis*, or *fatal jaundice*) is one of the most remarkable diseases to which the human body is subject. It consists, as a rule, of a rapid and complete destruction of the hepatic cells throughout every part of the gland. But it seems impossible to doubt that in a few instances the disintegration of these cells has been less extensive; the secretion of bile being consequently very defective, yet not entirely suppressed.

Causes.—Women are more obnoxious to this very rare affection than men. Pregnancy appears somehow to predispose to it, and it has happened more frequently between the third and seventh months of gestation than at other periods. It has also sometimes followed abortion. It would seem to be most common from about the age of seventeen to thirty.

Among the alleged exciting causes it is necessary to mention grief or anxiety, sudden alarm, and fits of passion; venereal excesses, syphilis, and the excessive use of mercury; drunkenness with dissolute habits; the influence of malaria; and the poison of typhus. Yellow fever has many points of resemblance with the disease under consideration. It is a constant consequence of poisoning by phosphorus, and probably many reported cases have been due to this cause. It occurs also in poisoning by arsenic.

Symptoms.—There may be a preliminary stage, during which complaint is chiefly made of headache, loss of appetite, thirst, drowsiness, mental and bodily depression, irregularity of the bowels, and tenderness of the abdomen. At the end of a variable period the conjunctivæ become yellow, and the skin gets slightly jaundiced. These precursory symptoms may last a few days, or upwards of three or four weeks; while they will possibly be altogether absent. When present they often fail to attract serious attention, the patient continuing to follow his usual occupation.

The symptoms which directly arise from acute atrophy of the liver are jaundice, sometimes with formation of petechiæ and large ecchymoses; and vomiting, at first of the contents of the stomach with mucus, and then of a matter like coffee-grounds owing to the presence of altered blood. The effects upon the nervous system are manifested at the onset by irritability and great despondency; but soon there is wandering which merges into noisy delirium and convulsions, followed by stupor and deep coma. The pulse is at the commencement infrequent; though as the cerebral disturbance is manifested it rises in frequency to about 120, becoming slow again as stupor sets in, and getting frequent and small as the fatal termination approaches. The tongue and teeth are coated with black sordes; while the abdomen is often tender, pains being complained of about the epigastric and right hypochondriac regions. The extent of hepatic dulness, at first perhaps increased, rapidly diminishes, while that of the spleen increases. There is always obstinate constipation; hard clay-coloured stools coming away under the influence of purgatives, with subsequently evacuations which are black from the presence of blood. The urine is natural in quantity; and it generally flows away involuntarily, or an inability to pass it may necessitate the use of a catheter. On analysis this secretion is found loaded with bile-pigment, and perhaps slightly albuminous; the natural solids being often diminished. A microscopic examination of concentrated urine will generally detect the presence of tyrosine and leucine; the former appearing as long needle-shaped crystals and small star-like bodies, while the latter are seen as finely-marked laminæ and globular masses with fissured surfaces and concentrically-thickened walls. Then lastly, the jaundice increases; bed sores form over the sacrum, if life be prolonged beyond a week or ten days; and there are hæmorrhages from the nose, stomach, bowels, bronchi, &c.

This disease usually ends fatally within a week from the appearance of the acute symptoms; while sometimes death occurs at the end of eighteen or twenty-four hours. It has been doubted whether recovery ever takes place; but although the cases in which the termination is favourable are very rare, yet it seems certain that some such have been met with.

Pathology, &c.—Examination after death reveals a considerable diminution in the size of the liver, the reduction being often to the extent of one-half or even two-thirds of the normal volume. The capsule is found opaque and puckered, while the parenchyma is soft and friable, flabby and shrunken; the cut surface presents a dark-yellow hue, the outline of the lobules is invisible, and the bloodvessels are almost empty. Under the microscope either no hepatic cells can be detected but only brown granules of biliary matter with oil-globules, or isolated cells loaded with fat or pigment are discovered. The gall-bladder is usually empty, and the bile ducts are free from any obstruction. In most of the recorded cases the spleen has been congested and enlarged. Sometimes the glandular epithelium of the kidney has been found in a state of fatty degeneration. The muscular fibres of the heart are usually in a state of marked granular degeneration.

"Acute atrophy of the liver," says Frerichs, "belongs to those obscure processes, as to the nature of which various opinions may be advanced, without it being possible for any one of them to obtain a general acknowledgment. The fact of the disappearance in a few days of one-half or one-third part of the original volume of a large gland abounding in blood, without any alteration in the bloodvessels leading to it, has a complete analogy in no other disease."* Rokitansky and others have referred the destruction of the hepatic cells to the action of an excess of bile in the portal system—to a bilious liquefaction. Buhl looks upon the disease as analogous to typhus. While again, it has been regarded as a diffused inflammation, the destruction of the cells by fatty degeneration arising from the accompanying acute exudation-process.

As no morbid appearances are found in the brain or its membranes to explain the nervous symptoms, they must be referred to changes in the blood. Frerichs attributes the cause of the blood-intoxication to the arrest of the hepatic functions consequent on the destruction of the secreting cells, and to the derangement of the renal secretion so that the elimination of urea is stopped. The former of these causes includes not only the absorption of bile, and the retention in the blood of the substances from which this secretion is formed, "but also the cessation of the powerful influence which the liver exerts over the processes of metamorphosis of matter, and the simultaneous passage of the disintegrated glandular substance into the blood."

From the consideration of the chief points in a case of this affection which was admitted into the Edinburgh Royal Infirmary, Dr. T. Grainger Stewart concludes, in a paper read before the Edinburgh Medico-Chirurgical Society on 5th July, 1865, that acute hepatic atrophy is a blood disease operating independently on the different abdominal viscera. The following are the considerations which seem to this gentleman to point to such an explanation:—(1) At the examination after death the blood was found dark and fluid, while the muscles were dry as they are in typhus fever and other blood diseases. (2) The spleen was soft and pulpy as it is in many febrile blood diseases. (3) The fact that the kidneys and the liver were affected by a peculiar and identical morbid process indicates that they were influenced by a common cause, that cause being situated in the blood and consisting of a form of fever poison. (4) The appearance and amount and effects of the exudation, being different from what is seen in simple inflammation either of the liver or kidneys, indicate that some peculiar matter was present in the system altering the ordinary processes. (5) The facts that this disease occurs so often during pregnancy, and that it seems to be induced by depressing mental emotions, serve to show that it is of a constitutional origin. And then (6) from all these considerations Dr. Grainger Stewart thinks that we cannot avoid concluding that this peculiar affection is a blood disease; and that it leads to atrophy of the liver by diffuse exudation into the hepatic cells, which is followed by a rapid fatty degeneration.

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* *A Clinical Treatise on Diseases of the Liver.* Vol. i. p. 227. Translated by Dr. Murchison for the New Sydenham Society. London, 1860.

Treatment.—Our ignorance of the primary nature of this disease, no less than its severity and rapid progress, must necessarily render the treatment empirical and often useless. The favourite remedies are at first drastic purgatives, then the mineral acids, and subsequently diffusible stimulants as depression sets in. Ice may be freely given to check the vomiting. Where the diagnosis is doubtful, and especially where the distinction between acute atrophy and bilious fever remains uncertain, Frerichs recommends large doses of quinine dissolved in acids.

2. ACHOLIA FROM OTHER CAUSES.

Blood poisoning must arise from all diseases which produce complete disorganization of the liver; while it will usually be attended with jaundice, hæmorrhages, delirium, coma, &c. On the other hand these symptoms are sometimes absent; for it has been rendered certain by the experiments which disease is constantly performing (as it were) for our instruction, that the constituents of the bile may be retained for a time in the blood without marked injury resulting.

The chief diseases which ultimately lead to destruction of the glandular epithelium, and consequently to complete arrest of the functions of the liver, are—cirrhosis, fatty degeneration, and extensive cancer; as well as those affections which produce an impermeable state of the ductus communis choledochus, or of the hepatic duct. In these cases it not uncommonly happens that severe indications of cerebral disturbance, quickly ending in fatal coma, are suddenly superadded to those other morbid symptoms which may have been long present.

3. CHRONIC ATROPHY OF THE LIVER.

This disease is in no way connected with acute atrophy. It results from all those conditions which tend to arrest the capillary circulation through the gland, and hence to lessen its nutrition.

The *causes* which diminish the size and functional activity of the liver are numerous. Great mischief can be originated by long-continued compression of the organ; such as may arise from tight lacing, extensive pleuritic effusion, great hypertrophy of the heart, constant distension of the ascending and transverse colon, chronic peritonitis, &c. The various forms of adhesive inflammation—either of Glisson's capsule or of the parenchyma, occlusion of the hepatic capillaries, obliteration of the trunk of the portal vein, the development of new growths, the cicatrization of abscesses, &c., will also all tend to produce more or less serious and extensive atrophy.

The *symptoms* that ensue from a persistent defective secretion of bile are developed slowly and insidiously. At the commencement there is usually imperfect performance of the functions of digestion, flatulence, alternately diarrhœa and constipation, pale-coloured stools, a dry sallow state of skin, and a falling off in flesh and strength. Then percussion shows that the dimensions of the liver are gradually lessening, so that sometimes there is scarcely any appreciable dulness. Of course, the digestive derangements lead to increasing debility; the patient, in the course of many months, becomes very anæmic and much wasted; and there will perhaps be fatal exhaustion, &c. Very frequently general dropsy sets in, which soon ends the suffering.

After death, the liver is found flabby and uneven on its surface with its capsule wrinkled; while it is either partially or wholly atrophied, according to the extent of the alterations which have been produced in the larger bloodvessels and biliary ducts. The hepatic cells in the portions of the gland affected are shrivelled up and much diminished in size, of a pale colour, devoid of granular contents, and perhaps loaded with oil or particles of bile-pigment. The capillary vessels appear more or less impermeable, while the trunk and branches of the portal vein are often enlarged. More rarely, the portal vein or the hepatic artery is plugged up.

A carefully directed plan of *treatment*, when early commenced, can do much to prolong life. The diet should be light but nourishing; being free from rich dishes, sugar, and fermented drinks. Warm clothing ought to be used, and over-fatigue carefully guarded against. To aid digestion recourse may be had to pepsine (F. 420); or to the purified ox-bile with ammonia (F. 170); or to what has answered better in my hands, a daily dinner-pill of ipecacuanha with quinine or rhubarb (F. 44, 384, 385). To combat the anæmia in these cases, it appears to me more advisable to trust to bark and the mineral acids, rather than to ferruginous tonics; for the latter have sometimes seemed to give rise to hepatic congestion, and thus to have increased the mischief. This remark does not hold good, however, with regard to the waters of the various chalybeate springs, which will often be used with much advantage. Consequently we may send the invalid to Harrogate

(F. 466), Spa in Belgium (F. 467), Kissingen in Bavaria (F. 493), or to Marienbad in Bohemia (F. 497).—When dropsy has set in, diuretics are to be resorted to; the patients being generally too weak to bear the employment of drastic purgatives. If the ascitic fluid be excessive temporary relief must be afforded by paracentesis.

VI. DEGENERATIONS OF THE LIVER.

1. FATTY DEGENERATION.

The hepatic cells in their normal state always contain a certain amount of oil; the degree varying with the nature of the food which has been digested. But in *fatty liver*, or *fatty degeneration of the liver*, the quantity is very much increased; so that the cells may be seen on a microscopic examination to be gorged with oil-globules, which diminish the normal granular matter and quite obscure the nucleolated nuclei.

The *causes* of this form of hepatic enlargement are usually constitutional. It is a condition that is of frequent occurrence in pulmonary consumption; as well as in fatty degeneration of other important organs—like the heart, kidneys, &c. Persons who live too freely, who indulge in alcoholic drinks, and who lead indolent lives, frequently suffer from it. It has also been met with during the progress of cancer, and of constitutional syphilis; as well as after death from some acute diseases, such as ichorhæmia, typhus, small-pox, erysipelas, &c. If we wished to produce a fatty liver, we could hardly take a better lesson than that which is taught by the poulterers of Strasbourg; who keep their geese in small cages, deprived of exercise, in a heated atmosphere, and with a large supply of carbonaceous food.

With regard to the *pathology* of this affection it appears probable that the accumulation of fat (chiefly olein) takes place only in the secreting cells; there being no deposit in the intercellular spaces of the parenchyma. Frerichs reminds us that appearances are not unfrequently in favour of a deposition in the intercellular spaces, inasmuch as in preparing sections for microscopic examination a number of cells become destroyed, and their fatty contents escaping appear to lie external to the cells. Unless the quantity of oil be considerable, it is often impossible to say that there is fatty degeneration without a minute examination. In the case of excessive degeneration, however, the gland is found of a dull yellow colour; it may be increased in breadth but diminished in thickness; and it is generally greasy and soft and flabby. The weight of the liver either remains unaffected, or it will be slightly increased, or it may be much diminished. The cut surface usually presents a reticulated appearance; there being reddish-brown patches corresponding to the hepatic veins, and around them light yellow rings which are conformable with the periphery of the lobules—the region of the portal vein. This nutmeg-like appearance is not characteristic of fatty degeneration, however, since it may occur in hepatic congestion, &c.

According to Frerichs the alteration in the hepatic cells usually commences at the periphery of the lobules, in the region of the interlobular vessels belonging to the portal vein; while it gradually advances towards the centre of the lobules where the hepatic veins arise.

The general *symptoms* are often slight. The powers of life wane, but they do so gradually and silently. Unless there be considerable accumulation of fat in the hepatic cells, the functions of the liver are not deranged; so that there is neither pain, jaundice, nor dropsy. If the cells be much loaded, however, they may impede the circulation of blood in the capillaries, as well as obstruct the excretion of bile. Under these circumstances gastric catarrh, indigestion, a sense of weight and fulness in the right hypochondrium, a pasty complexion, a smooth and waxy-looking state of the integuments, sometimes constipation or occasionally diarrhœa with pale clay-coloured stools, anæmia, hæmorrhoids, possibly ascites, and even fatal exhaustion or complete acholia, may result. But it is very seldom that there are these serious symptoms; perhaps because the primary systemic disorder proves fatal before there is time for their occurrence.

The *treatment* of fatty liver when it occurs as a secondary affection scarcely requires consideration, seeing that it can be of comparatively slight importance where there is phthisis, fatty degeneration of the muscular fibres of the heart, cancer, syphilis, &c. But if this hepatic disease should be diagnosed as the sole affection of the system (which is very rarely accomplished), its cure ought to be attempted; while as we have merely to free the hepatic cells of their excess of fat, the minute elements of the liver not being disorganized, there is every reason to hope for success. The most important remedy is the regulation of the diet; alcoholic drinks, sugar, amylaceous matters, and fat being interdicted. A large proportion of plainly cooked animal food may be allowed, with a moderate allowance of fresh fruits, &c. Torpidity of the bowels is to be overcome by active exercise in the open air: as well as by rhubarb or sulphate of soda, or by the use of the waters of Carlsbad, Pullna, Kissingen, &c. The remedies from which the best results may be expected are the various preparations of iron, chloride of ammonium, chlorate of potash, and (where there is any suspicion of a syphilitic taint) the iodide of potassium; but should either of these drugs appear to induce debility, or to destroy the powers of the stomach, or to take away the appetite, they must be exchanged for bitter vegetable substances.

2. AMYLOID DEGENERATION.

This structural disease of the liver does not demand much attention in this place, since its pathology has already been treated of with as much latitude as the present extent of our knowledge will allow.

The important condition known as amyloid degeneration (the *waxy, albuminous, lardaceous,* or *scrofulous liver*) can coexist with fatty liver, or with cirrhotic induration, or with syphilitic cicatrices and gummatous nodules, or it may alone be present. In it, the coats of the small bloodvessels are first affected; and then the glandular structure of the organ is gradually converted into a dense material. Hence results destruction of the gland-cells, with abolition of their functions. The liver is found after death much increased in weight and size, so that instead of weighing from three to four pounds avoirdupois, it may average eight or nine. Its substance is also tough, and somewhat resembles yellow wax; and the cut surface presents only faint traces of lobules. Minutely examined, the cells are found compressed, irregular in form, and with their nuclei atrophied.

This peculiar state of the liver occurs in phthisis much more rarely than fatty liver does; with which, however, it has been sometimes confounded when in an early stage. It is frequently met with in the subjects of constitutional syphilis, even when the osseous system is healthy. But it is perhaps most commonly found in young male adults who have long suffered from protracted suppuration owing to scrofulous or other forms of caries of the bones; whence it was at one time thought to be peculiar to this disease. The infiltration, or degeneration, takes place insidiously; the first indication of its existence being the increased size of the gland. The biliary secretion lessens as the cells degenerate. Then the circulation gets impeded, as well as the escape of bile from the ducts; so that the superficial veins of the abdomen enlarge, a small quantity of fluid collects in the peritoneum, anæmia to a marked degree sets in, the countenance presents a peculiar dusky-sallow hue, while occasionally the skin and conjunctivæ become of a decided yellow tinge. As the enlargement of the liver progresses, so the general health and strength decidedly deteriorate. Various complications also occur; the chief of these being a troublesome persistent diarrhœa, attacks of nausea and retching, loss of appetite, transient attacks of fever, a tendency to inflammation of internal organs, and general irritability with insomnia. Should anasarca set in, with the accumulation of fluid in the peritoneum, there will follow at no long interval emaciation and exhaustion and death.

The disease being constitutional its ravages are by no means limited to the liver. The spleen and kidneys are likewise very generally involved in the morbid process; while sometimes the lymphatic glands, as well as the gastro-intestinal mucous membrane, are also affected. The renal disorder is more serious and fatal than the hepatic; its existence being rendered certain by gradually increasing bad health, together with the persistent presence of albumen in the urine, as well as of transparent waxy-looking casts of the secreting tubules.

On the subject of treatment it need only be remarked that disappointment has hitherto followed almost all attempts at cure. The disease slowly but steadily advances to a fatal termination. If any good can be done, it is by the use of remedies directed to the relief of the cause. Thus, if there be constitutional syphilis, iodide of potassium or iodide of iron should be employed; or the tincture of iodine alone, with the use of iodine ointment to the abdominal walls, may be deserving of trial. In some instances benefit has temporarily accrued from the employment of iron—especially the perchloride; or from the nitro-muriatic acid and bitter tinctures. Then any suppurative affection ought to be cured; while if there be disease of the bones surgical interference can perhaps be of some avail. In all cases attempts are to be made to prevent the occurrence of complications, as well as to relieve the prominent symptoms. The general health must be attended to; while the system is to be supported by regulated quantities of good wine, by breathing a pure atmosphere, by warm or tepid sea-water baths, and by easily digested nourishing food.

3. THE PIGMENT-LIVER.

After death from severe intermittent, remittent, or continued fevers, the liver is sometimes found to present a blackish or chocolate colour; brown insulated figures being observed upon a dark ground. The cause, &c., of this change of colour has been particularly examined by Frerichs; who says that it is due to the accumulation of pigment matter in the vascular apparatus of the gland. On magnifying fine sections of the hardened tissue, accumulations of pigment are to be seen in the capillary network of the portal and hepatic veins; while the branches of the hepatic artery also contain quantities of black colouring matter. The same melanotic material may often also be found in the parenchyma of the spleen; while the kidneys, brain, and other organs are less constantly implicated. The pigment is carried to the tissues by the blood; and if this fluid be minutely examined, it will be seen to contain small granular masses, together with nucleated pigment cells having black granules in their interior. It is generally believed that the melanotic matter is formed in the spleen; owing to stagnation of the blood in the venous sinuses, arising from the intense congestions which affect this organ during the course of all malarious fevers.

The chief consequence of this pigment formation is an impediment to the circulation of the blood through the liver; so that the gland at first becomes congested, and subsequently atrophied. The non-arrest of particles of the pigment as they circulate through the liver and lungs, allows them to be carried to the brain, in the narrow capillaries of which they accumulate, and they may subsequently induce severe cerebral disturbance.

The occurrence of this condition shows how necessary it is to cure all diseases dependent upon marsh miasmata as quickly as possible; lest the capillaries of the liver get loaded with melanotic matter, leading to their destruction, and of course to atrophy of the gland. When the latter is established (as indicated by gastric catarrh, a greyish-yellow colour of the skin, nausea and diarrhœa, and severe cerebral symptoms or ascites) it will be too late to hope for benefit from the employment of quinine or any other drugs.

VII. HEPATIC TUMOURS.

The most significant new-formations which have their seat in the liver are the hydatid tumours and cancerous infiltrations. There are, however, two or three other growths occasionally met with; but they are of so little importance that they only require a very brief notice.

1. CYSTIC TUMOURS OF THE LIVER.

Encysted knotty tumours, containing a cheese-like substance, have been described by Dr. Budd. They are found in the substance of the gland, varying in bulk from the size of a large pea to that of a small potato; they are of a white or pale yellowish colour; and they have a nodulous form. A minute examination shows that the steatomatous-looking matter is composed of a mass of irregular granules and free oil-globules, while occasionally a few plates of cholesterine can be discovered. These tubera appear to have their origin in inflammation of the mucous lining of the hepatic ducts; in consequence of which morbid process a duct becomes closed at some point, so that no outlet remains for its secretions. The latter therefore accumulate, dilate the affected canal, and at length form the unorganized cheese-like matter.

Sacculated pouches or cysts, containing a glairy fluid, are formed in the same manner as the knotty tumours. Cruveilhier has reported a case where the liver must have been crowded with these irregular cavities, each containing mucus more or less tinged with bile. The signs of pre-existent hepatitis were distinct.

The patient died from exhaustion, his chief symptoms having been jaundice and daily increasing debility.

Simple serous cysts, with clear watery contents, are sometimes found scattered through the liver. They are seldom much larger than small beans, are lined with tessellated epithelium, and they have not seemed to have any connexion with the bile ducts. In several instances coexisting cysts have been discovered in the kidneys.

2. CAVERNOUS TUMOURS OF THE LIVER.

These tumours are not uncommonly found on the upper surface of the liver, especially in the bodies of aged persons. They are developed in the hypertrophied connective tissue. On looking at the gland one or more dark blue coloured and irregular spaces are seen, varying in size from that of a pea to that of a common hen's egg; on cutting into which a tissue is found resembling that of the corpora cavernosa of the penis, containing a quantity of dark blood. According to Rokitansky a connexion can always be traced between the latter and some of the branches of the portal vein; while the structures will be found prominent or collapsed according to the amount of blood contained in their compartments. So far as our experience at present goes, these cavernous vascular spaces give rise to neither local nor general disturbance.

3. TUBERCULOSIS OF THE LIVER.

Tubercular deposits are very rarely discovered in the liver, and probably never as a primary disease. Where they have been found, it has been in connexion with far-advanced tuberculosis of other organs, especially of the abdominal viscera. Hepatic tubercle occurs over all the portions of the gland, in the shape of semi-transparent miliary granules, or as yellow adipose deposits; the patient generally succumbing to the constitutional affection, before there has been time for the stage of softening to set in. Still, small vomicæ do occasionally form, and then care will be required to distinguish them from a morbid dilatation of the gall-ducts. Rokitansky* states that this latter condition is almost invariably met with in combination with hepatic tubercle, and is not unfrequently coexistent with tubercular disease of other organs. These dilatations or cavities are of the size of a millet-seed or of a pea, with flaccid parietes; they are filled with viscid, muco-bilious, dirty-green matter; they are scattered throughout the liver; and they consist of swollen capillary gall-ducts. The hepatic tubercles exist at the same time, and at various distances from the cavities: occasionally a tubercle will be found near one of the latter, but it is not characterized by the symptoms of secondary deposit accompanying the fusion of tubercular matter.

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* *A Manual of Pathological Anatomy.* Vol. ii. p. 150. Translated by Dr. Sieveking for the Sydenham Society. London, 1849.

4. HYDATID TUMOURS OF THE LIVER.

Hydatid [from ʽΥδατὶς = a vesicle] tumours occur in the liver more frequently than in any other organ. They are occasionally met with, however, in the subperitoneal connective tissue, the spleen, the omentum, the muscles of the heart, the brain, the kidneys, the lungs, and in the bones—particularly the tibia.

Pathology.—These growths consist of a sac, formed by the condensation of surrounding tissue, lined by a bladder or cyst, and filled with a limpid and colourless salt fluid; floating in which numerous small cysts similar to that lining the sac, and varying in their measurements from the size of a small seed to that of a fowl's egg, will usually be found. To these cysts or bladders Laennec gave the name of acephalocysts—bladders without heads ['A = priv. + κεφαλὴ = the head; and κύστις = a bladder]. The acephalocyst lining the sac is composed of several finely laminated and friable coats possessing the firmness of coagulated albumen. Sometimes this parent cyst contains no floating hydatids, or very few; in other cases it is literally crammed with them; and these again, it is said, may contain a third, and the latter even a fourth generation. To distinguish these different kinds as well as to mark the mode of their increase, naturalists have divided these productions into two species: 1st, the *acephalocystis endogena* of Kuhn—likewise called *socialis vel prolifera* by Cruveilhier, the *pill-box hydatid* of Hunter—which is the kind most commonly developed in the human subject, and in which the fissiparous process of generation takes place usually from the internal surface of the parent cyst, the progeny being sometimes successively included; and 2nd, the *acephalocystis exogena* of Kuhn—*eremita vel sterilis* of Cruveilhier—which develops its progeny generally from the external surface, and is found in the ox and other domestic animals. The true nature of these bodies is no longer doubtful. When an acephalocyst is opened, its inner surface is seen to be studded with numerous little elevated opaque spots or granules; which buds or offsets, on being carefully scraped away and minutely examined, will be found to consist of *Echinococci* ['Εχῖνος = the hedgehog + κόκκος = a berry], from the cylinder of hooks surrounding the head. The fluid of the cyst also contains echinococci, which can be obtained from the sediment after subsidence has taken place in a conical glass; inasmuch as they are developed in groups on the inner wall of the hydatid vesicles, many subsequently becoming detached and dying.

The relation of hydatids to tapeworms has only been clearly made out within the last few years. But it is now certain that echinococci are merely the progeny of a minute tapeworm, in a special stage of development,—in short, they are the larval conditions of the Tænia echinococcus of the dog and wolf, a worm about four lines in length, provided with a head having four suckers and a circle of hooks. Consequently, "whilst the mature worm has thus a very limited territory for its place of residence, its peculiar larvæ, on the other hand, are found dwelling in a great variety of animals. Amongst the bearers are men, monkeys, sheep, oxen, deer, camels, the giraffe, and other ruminants; also the horse ass, zebra, several feline animals, and perhaps the squirrel."* This immature tapeworm—the scolex of the tænia echinococcus—is a transparent, colourless, oval-shaped worm; displaying an apparatus of suctorial prominences with hooklets at the cephalic extremity; and measuring about the one two-hundredth of an inch in length, and rather less in breadth. In structure, the parasite is a mere integument; the head and neck, which are equivalent to one half, being susceptible of retraction into the other half. The head is a flat disc at the extremity of the neck, having imbedded in its substance an apparatus of small hooks, thirty-four in number, disposed in a circle. Immediately behind this head are the four rounded suctorial processes, beyond which follows the body; while at the extremity of this is a short peduncle by which the animal attaches itself to the wall of the acephalocyst. When the animal is viewed with its head retracted within its body, the circle of hooks is seen through the transparent integument appearing like a ring in the centre of the body.†

Symptoms.—When a hydatid tumour forms in the liver, its growth is generally slow. For a considerable period it may give rise to little inconvenience beyond a sensation of weight, and a remarkable feature of the affection is the slight disturbance which it excites. Fever, pain, jaundice, anæmia, loss of strength, &c., if present are only accidental complications. When the tumour is of a large size, it may then be easily felt; it will be firm and elastic; sometimes a peculiar vibration is communicated to the hand when it is smartly tapped, but this is not constant; fluctuation cannot always be made out. If the cyst inflames and suppurates, violent pains result. Where the growth attains a great size it will perhaps compress the portal vein or vena cava, causing ascites and œdema of the legs. It may burst into the peritoneum, setting up peritonitis which is not necessarily fatal; or into the lung, or pleural cavity; or even into the sac of the pericardium, producing instant death. Now and then a communication has formed between the cyst and the hepatic duct—whence the contents of the sac have passed through the common duct into the duodenum; or the cyst has opened directly into the intestines, or in a contrary direction through the abdominal wall. In the three latter cases, the contents will often be entirely discharged, and the sac ultimately closing up will leave the patient well. When the tumour bulges into the thorax it interferes with the proper performance of the functions of the lungs and heart, and it may burst into the pleural cavity. If it open into the base of the lung, or into one of the bronchi, the patient becomes so worn out with the constant expectoration of hydatids and puriform matter, while the constitutional disturbance is so severe, that he generally sinks under the mischief. Suppuration of the cyst with fatal pyæmia is not a very infrequent termination.

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* *Entozoa: an Introduction to the Study of Helminthology, &c.* By T. Spencer Cobbold, M.D., &c., p. 261. London, 1864.

† Erasmus Wilson on the Echinococcus Hominis. *Medico-Chirurgical Transactions*, vol. xxviii. p. 26, &c. London, 1845.

Sometimes a hydatid tumour gets well without opening; this happening most frequently by the absorption of the fluid contents, and sometimes by the secretion of a thick and putty-like matter within its sac. Whether this secretion result from the death of the hydatids, or whether it is the cause of their destruction, is uncertain. The first view, however, is the most reasonable one.

The echinococcus disease is endemic in Iceland; so that, according to Leuckart, the practitioners (few in number) not unfrequently have upwards of 100 cases under treatment at the same time, while it is the cause of nearly one-sixth of the total number of deaths. Although this is probably an exaggerated estimate, yet without doubt the disease is so prevalent as almost to constitute a plague. For every 100 Icelanders there are 1100 head of horned cattle, while every peasant has on the average six dogs; which dogs have constant access to the water used by their masters for drinking, &c. The ova of the tænia echinococcus are thus swallowed by the human subjects; and passing from the stomach or bowel into the liver, undergo development there.

Diagnosis.—When a large hydatid tumour occupies the right hypochondrium, it need not necessarily be situated in the liver; for it may have its origin in the omentum, or in the subperitoneal areolar tissue, or in the right kidney. One of the largest tumours of this kind that I ever saw was diagnosed during life as arising from the liver; but it was found after death to be seated in the omentum. In the same way, when the tumour fills the left half of the abdomen chiefly, it will often be difficult to say whether it is connected with the spleen, omentum, or left kidney.

From time to time cases of more than ordinary difficulty, as regards diagnosis, are met with. This is especially true when the tumour is so large as to extend low down into the pelvis. Thus, an enormous hepatic tumour has been mistaken for a bony growth from the promontory of the sacrum, obstructing labour at the full time. As delivery by the natural passages seemed to be impossible, the Cæsarean section was performed by Dr. Sadler; the patient dying a few hours afterwards. At the necroscopy, the obstructing cause was found to consist of an immense hydatid tumour; which not only occupied the whole upper part of the abdomen, but extended downwards to the pelvis where it had been so compressed by the uterus as to assume a bony consistence.* In another remarkable instance the abdomen was opened by Mr. Thomas Smith to extract a supposed unilocular ovarian cyst. The disease was found to consist, however, of a large hydatid tumour of hepatic origin. Fortunately the patient recovered completely.†

Treatment.—Several agents have been supposed to possess the power of stopping the growth of hydatid tumours. The chief of these are iodide of potassium, calomel, and common salt: sulphur baths and electricity have also been employed. Most observers now agree that little benefit is derived from such remedies. But I confess that my faith in the power of full doses of iodide of potassium to cause absorption of the fluid portion of the cysts, and thus to insure the destruction of the hydatids, has been greater than that of most other physicians. And indeed, I should speak more strongly upon this point, were it not for the exceeding difficulty of estimating the value of any drug from its employment in a limited number of cases; a difficulty which is increased when it has to be allowed that the action of the medicine is not uniformly favourable. Now, there can be no doubt that the iodide does frequently fail to effect any good in the disease under consideration. Nevertheless, in some instances patients have expressed themselves as feeling much relieved by this medicine; and in two cases of well-marked hepatic tumour recovery ensued while it was being taken. As one of these subsequently died after parturition, the diagnosis of hydatid disease was verified. The second patient remains well.

When the tumour has attained such a size as to be accessible to operation, surgical interference should be resorted to. Usually the removal of the limpid fluid by means of a fine trocar or by the aspirator, is sufficient, the scolices perishing and the sac contracting. Dr. Fagge and Mr. Durham have treated eight cases by electrolysis with success in all; it is probable that the mode of cure in this treatment is by the expulsion of fluid by the gases evolved, this escaping into the peritoneal cavity; simple acupuncture has also proved successful. Various substances have been injected—iodine, dilute alcohol, carbolic acid—but this is rarely necessary, and should be practised only when simple tapping fails. In case of suppuration of the hydatid, a free incision should be made when practicable, or injection of iodine or weak solution of carbolic acid, or the insertion of a drainage tube may be tried.

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* *The Medical Times and Gazette*, p. 141. London, 6th August, 1864.

† *The British Medical Journal*, p. 97. London, 1st February, 1868.

5. CANCER OF THE LIVER.

Every form of cancer, not even excepting the gelatiniform or colloid variety, has been met with in the liver. Of the two most frequent kinds, medullary or soft cancer appears to be more common than the scirrhous or hard variety. The disease may invade any part of the gland, either as a primary or as a secondary disorder. Probably in one-twelfth of all cases of cancer the liver is affected.

Pathology.—Hepatic cancer commonly takes the form of distinct and well-defined masses implanted in different parts of the gland; or in some exceptional instances, portions of the liver may be infiltrated with cancerous matter, the diseased segments merging insensibly into the healthy tissue without any distinct line of demarcation. In the first case, the nodules usually vary in bulk from the size of a pea to that of an orange, though they are sometimes much larger; while the smaller they are, the more abundantly do they stud the organ. Frequently they present an appearance as if spherical masses of firm lard were embedded in the parenchyma; though in scirrhus their consistence may be as great as that of cartilage. Very rarely is there a well-defined capsule. Occasionally there is hæmorrhage into the cancerous stroma; which, if abundant, may produce rupture of the serous covering of the liver, and cause sudden death. The portal vein and its branches are much more commonly implicated in the disease than the hepatic venous vessels; the lymphatic glands and vessels are often involved; and the bile ducts may be compressed or obliterated.

With regard to infiltrated cancer it is only necessary to say that it seldom occurs without the nodulated form being likewise present, and that extravasations of blood and bile are often found in its structure. In both forms the hepatic cells in the neighbourhood of the disease are usually discovered in a state of fatty degeneration.

Symptoms.—This disease commences in an insidious manner. For a few months there are no active symptoms, but the victim feels that he is losing strength and energy, and getting thin. Probably he attributes his malaise to over work, but for several weeks he fails to take advice. Frequently, indeed, this is forced upon him by his friends, who take alarm at his altered appearance. Even now, if the patient be only cursorily examined by his medical man, the real nature of the case may be overlooked; though if a careful examination of the hepatic region be made there will be found one or more hard lumps, or else a general enlargement and hardening of the gland. When a liver contains numerous masses of cancer, we shall find (in addition to the general indications of malignant disease) that it is generally much enlarged, extending far below the false ribs, sometimes even to the brim of the pelvis; while its regular form is lost, and uneven bulging prominences can be detected on the surface. The nodulous masses do not give rise to inflammation of the hepatic tissue; but when superficial they often cause peritonitis, which is generally very partial and of the adhesive kind, so that after death the tumours are found adherent to the diaphragm or to the abdominal walls. The remaining symptoms are somewhat obscure: loss of flesh and strength, short attacks of diffused pain and tenderness, disorder of the digestive organs varying from time to time, and great irritability with mental depression, being generally the most prominent. In some cases there is great suffering, in others there is very little pain. Towards the termination petechiæ often appear and hæmorrhage from the nose, gums, or stomach may occur. Jaundice occurs more frequently than ascites; while in about one-fifth of all the cases both these conditions will be combined. The formation of gall stones not unfrequently adds to the suffering. The duration of hepatic cancer, except in the case of scirrhus, is usually short; life sometimes closing within six months from the first appearance of the symptoms, while it is very seldom prolonged for two years.

Where the disease presses upon the common duct so as to render it impermeable, the gall bladder may become greatly distended. In one instance it thus acquired the size of the fœtal head. The liver itself also gets swollen from biliary congestion, as well as from the disease.

Causes.—Malignant disease of the liver is for the most part a secondary affection; that is to say, it results from the transfer of cancer cells by lymphatics and veins from the breast, stomach, kidney, &c. When primary, it does not occur before the age of thirty-five; while though it frequently spreads to contiguous organs, it only rarely contaminates remote structures.

Treatment.—Our remedies can only be palliative; such drugs as calomel, corrosive sublimate, iodine, and arsenic only serving to impoverish the blood, and to hasten the fatal termination. Relief to the pain must be given by sedatives—especially by conium and belladonna; sleep is to be given by the hydrate of chloral, Indian hemp, &c.; while the digestive organs should be strengthened by mild tonics, and a light nourishing diet. The action of opium is seldom favourable in hepatic cancer, though it should not be withheld when there is much pain or diarrhœa.

VIII. DISEASES OF THE BILIARY PASSAGES.

Under this head we have to consider those diseases which affect the biliary ducts, from their commencement in the glandular parenchyma, to their termination in the duodenum; so that this section comprehends the disorders of the hepatic duct and its capillary branches, the cystic duct, the ductus communis choledochus, and the gall bladder. The diseases of these passages give rise to important symptoms in proportion to the extent to which they impede the flow of bile from the liver, and the degree in which the hepatic parenchyma is involved in the morbid process.

1. INFLAMMATION OF THE BILIARY PASSAGES.

The biliary ducts and gall bladder are now and then attacked by different forms of inflammation. Thus, there may be *catarrhal* inflammation; in which (as in similar affections of other mucous membranes) the secretion of mucus is increased, while it is also altered in quality, becoming viscid or muco-purulent. Occasionally the cystic or the common duct will thus become obstructed with a firm plug of mucus; but as the latter does not get organized, it is carried onwards or breaks up after a time, so that the excretion of bile is again rendered free. The lining membrane of the capillary ducts may also be thickened by catarrhal inflammation; their diminished calibre leading to retention of the secretion, and consequently to dilatation. This disease generally has its origin in catarrh of the stomach and duodenum; the extension of it to the gland taking place through the common duct.—In *exudative* or *plastic* inflammation, there is either a firm fibrinous or a croupal product. This forms casts of the tubes, blocking them up and leading to their dilatation. To find these exudations is a very exceptional event. Nevertheless, they have been met with after death from typhus, erysipelas, pyæmia, cholera, &c.—And then, the biliary passages may suffer from *suppurative* inflammation, leading to the secretion of pus and a thick kind of mucus tinged with bile. Where the abnormal action is of long continuance, ulceration may be set up. Ulceration of the gall bladder is often found when this reservoir is irritated by one or more gall stones; the concretion and the ulceration not always standing in the relation of cause and effect, because both may originate at the same time from an unhealthy condition of the bile. Moreover, the mischief set up by retained and decomposing bile will possibly induce ulceration without any concretion being formed; ulceration has been found after death from remittent fever.

When ulceration occurs, and especially if from any cause the bile is retained in the gall bladder, the immediate consequences may be perforation, effusion of bile into the abdominal cavity, and fatal peritonitis: or, if adhesive inflammation have previously occurred, abscess will perhaps result and open into the bowel or externally; or closure of the cystic duct may follow, rendering the gall bladder useless and causing the bile to flow continuously into the duodenum, often without giving rise to any marked results. The case is very different in the latter respect when there is permanent closure of the common duct; inasmuch as this occurrence leads to the gradual destruction of the hepatic cells, to atrophy of the capillary bloodvessels, and to a complete wasting of the lobular substance. Some remarkable cases have been recorded where the patients have thus lived for several months after there has ceased to be any discharge of bile from the liver, since none could be secreted; and in which there has been deep and persistent jaundice, attacks of gastric or intestinal hæmorrhage, wasting with hectic fever, and sometimes constipation alternating with diarrhœa. Death has occurred from gradually increasing exhaustion; and strange to say, without the occurrence of any cerebral disturbance.

Inflammation of the mucous membrane of the biliary passages gives rise to *symptoms* of very variable severity. The gall bladder, cystic duct, and common ducts are more obnoxious to this morbid action than the hepatic ducts; since the latter are less likely to be irritated by gall stones and unhealthy conditions of the bile. When there is merely catarrhal inflammation we find slight tenderness, tightness about the epigastric and right hypochondriac regions, nausea, a sluggish action of the bowels, mild fever and jaundice if the mucus secreted be sufficiently viscid and abundant to choke up many of the ducts; the symptoms ending in a beneficial attack of diarrhœa as soon as the pent-up bile finds its way into the duodenum.

The biliary passages may all become dilated, from their origin in that plexiform network in which the hepatic cells lie, to the termination of the common excretory duct of the liver and gall bladder in the duodenum. Generally speaking, the expansion is only partial. In either case, it can arise from the habitual accumulation of inspissated bile; from compression of the ducts by tumours or disease of the parenchyma; from inflammatory swelling of the mucous lining diminishing the calibre of the tubes, and so leading to the retention of their secretions as well as of the bile; and from obstruction by calculi, catarrhal or croupy exudations, &c. Owing to obstruction of the duodenal orifice, the ductus communis choledochus has been found enlarged to the diameter of the small intestine. When the gall bladder is unable to get rid of its contents in consequence of occlusion of the cystic duct, the residuary bile may be absorbed; but if the lining membrane continues to secrete mucus, dropsy of the cyst will result from the accumulation, and a large pear-shaped or globular tumour may be found, containing some pints of fluid. Under these circumstances, rupture of the bladder has been prevented by tapping; an operation which can be safely performed provided there are adhesions to the abdominal wall, and even without such adhesions by the employment of the aspirator and a fine needle.

With regard to the *treatment* of inflammation of the biliary passages, the remedies required in acute cases are rest, restricted diet, and mild aperients. Warm baths are useful, and where there is much pain, fomentations and sedatives will relieve it; if there be fever and thirst, simple diluents are to be freely allowed; while as soon as exhaustion sets in, it must be combated by easily digested restorative food, and ammonia with bark, &c. Supposing we could feel certain that the obstruction was due to a portion of inspissated mucus, an emetic might drive the tenacious plug onwards. In those cases where the catarrhal inflammation becomes chronic, and where some few months elapse without the customary discharge of bile freely returning, the employment of the nitro-hydrochloric acid (F. 378), or a visit to one of the mineral springs had better be recommended. The waters of most service are those of Carlsbad (F. 496), Marienbad (497), Kissingen (F. 493), and the like.

2. ENTOZOA IN THE BILIARY PASSAGES.

The proper habitat of the *Ascaris lumbricoides* is the small intestine. But every now and then this worm migrates upwards into the stomach, or downwards into the colon and rectum. Moreover, it may perforate the abdominal walls. Consequently it is not surprising, that in a few instances a lumbricus has found its way, by the duodenal orifice of the ductus communis choledochus, into the gall bladder or up the branches of the hepatic ducts; a journey which it would more easily accomplish, if the opening were stretched by the previous passage of a calculus or hydatid. The consequence has been very considerable irritation of the ducts, as well as obstruction to the flow of bile. Cases of fatal jaundice have occurred from the blocking up of the common duct by a large round worm; rupture of the duct has taken place from the same cause; while if this helminth passes into the branches of the hepatic duct it may not only impede the flow of bile, but set up catarrhal or exudative inflammation, dilatation, and perhaps rupture of the duct, ulceration, or suppuration. Lobstein found a gall stone in the common duct, the nucleus of which was composed of a round worm.

The *Distoma hepaticum* (more correctly, the *Fasciola hepatica*), familiarly known as the liver-fluke, is a flat trematode helminth, rather more or less than an inch in length, and about half an inch broad. It has a perforated oral, and an imperforate ventral sucker; the latter serving as "an anchor or holdfast," while both are employed as organs of locomotion. The oral disc also assists as "a prehensile organ for taking in the biliary secretion on which the animal feeds;" whilst the pharyngeal sphincter prevents the regurgitation of food after it has distended the stomachal passages

(Cobbold). The œsophagus is short: it ends in two primary intestinal divisions, which in their course give off numerous secondary branches, and these again subdivide; all these tubes terminating in blind cæcal extremities. The male and female generative organs are placed in the same individual.

The Distoma hepaticum is the pest of grazing cattle when they are confined to marshy or wet grounds. With sheep it produces the disease called the *rot;* in which affection the liver is sometimes found containing several hundred flukes. It has been estimated that upwards of one million sheep and lambs die annually in this country from the rot, some of the epidemics being much more severe than others. This entozoon has been very rarely found in the human subject. Mr. Partridge obtained one from the gall bladder of a patient who died at the Middlesex Hospital, which Professor Owen considered was in no respect different to the Distoma hepaticum of the sheep. M. Duval also discovered several in the portal vein; and other instances have been reported. As the presence of this fluke in man has never been diagnosed during life, no treatment has been adopted. In sheep, the severe effects of the rot seem to admit of palliation by removing the animals to dry ground, feeding them on beans and peas, &c., and by the free administration of common salt.

The *Distoma lanceolatum* is much smaller than the Fasciola hepatica, measuring only the third of an inch in length, and about one line and a half in breadth. Instead of being rounded at each end like the latter it has a lanceolate form, the caudal being more obtuse than the oral extremity. It has two suckers. The œsophagus divides into two blind and non-branching intestinal tubes: moreover, each individual has male organs, as well as ovaria and oviducts and a long uterine canal. This species is found in the liver of the ox and sheep, but less frequently than the Fasciola hepatica.

Only three instances are known where the Distoma lanceolatum has been detected in the human subject. Bucholz obtained several from the gall bladder of a prisoner who died of typhus at Weimar. Chabert found a large number in the stools of a girl, which were expelled after a dose of empyreumatic oil. And Dr. Kichner, of Kaplitz in Bohemia, met with the case of a young girl, who died after suffering pain in the liver for some years, and whose gall bladder contained eight calculi with forty-seven specimens of this small trematode helminth. The liver of this patient weighed eleven pounds.

3. GALL STONES.

These concretions are more frequently formed in the gall bladder than in the substance of the liver, in the branches of the hepatic duct. Solitary calculi, when found in the gall bladder, are globular or oval or pear-shaped; associated gall stones usually have numerous polished facets, the result of pressure and mutual attrition; while when several stones are found accurately fitted to each other, they are said to be articulating. Very rarely, these bodies have the shape of flattened leaf-like concretions, with glistening metallic surfaces; or they may assume the figure of pale-blue six-sided discs. Gall stones which are formed in the branches of the hepatic duct are small, rough or tuberculated, and of a dark colour—so that they have been compared to black peppercorns; while in a few instances they have been found branched and moulded to the shape of the bile ducts in which they have been developed. And, lastly, gritty sand-like deposits (biliary gravel) are met with in the excretory passages of the liver; consisting either of very minute calculi, or of a powder made up of cholesterine and cholochrome.

The size of gall stones varies from that of a small seed to that of the common fowl's egg. Solitary calculi are usually larger than those which are associated. Their weight is inconsiderable. When fresh, their specific gravity is greater than that of water or bile; though on being dried it becomes less, so that then they readily float in water. Their shades of colour vary from a pearly white (when consisting of almost pure cholesterine) to a deep black; but perhaps most frequently they are of a reddish-brown tint. According to Frerichs, two forms of structure are met with:—(1) The simple, homogeneous calculi, of a uniform texture, and presenting an earthy or saponaceous or crystalline fracture. They are rare. (2) The compound calculi, consisting of a central nucleus, surrounded by a body or case of greater or less thickness, which in its turn is usually covered by an outer crust.

In the majority of hepatic calculi there is a brown or black *nucleus*. Dr. Thudichum in his admirable treatise* has shown that this nucleus sometimes consists of casts of the biliary tubes. Rarely it has been formed of some foreign body,—as of a dried-up ascaris, a fragment of a Fasciola hepatica, a plum-stone (the calculus having been developed in an abscess of the liver, the result of a perforating gastric ulcer), and part of a needle three-quarters of an inch long. Now and then four or five nuclei are observed, the result of the consolidation of originally separate calculi. The *body*, or that part of the concretion between the nucleus and crust, is generally striated, and consists of radiated crystals of cholesterine; or it presents concentric laminæ; or it is formed of an irregular mixture of chloresterine, with colouring matter and the products of decomposing bile. The outer *crust* can often be separated from the body like a shell: it consists of concentric layers, of different thickness; and it may be made up of cholesterine, or of a compound of cholepyrrhin and lime, or of carbonate of lime.

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* *A Treatise on Gall Stones: their Chemistry, Pathology, and Treatment*, p. 60. London, 1863.

The ingredients of gall stones are,—cholesterine (commonly from 80 to 90 per cent.); cholochrome or colouring matter, combined with earthy and alkaline salts—such as phosphate and carbonate of lime and magnesia; together with biliary and fatty acids. Gall stones arise from a decomposition of the bile, akin to putrefaction. The cholesterine of human bile "is dissolved in the taurocholate of soda. But as soon as the acid of this salt is decomposed the cholesterine is set free, crystallizes, and deposits upon any particle that may happen to be within easy distance, in the manner of all crystals, which like to post themselves upon prominent bodies" (Thudichum, p. 167).

The tendency to gall stones is rarely manifested until between the ages of thirty and forty years; though a few instances are recorded where these bodies have been found during infancy, and even in the newborn child. It is probable that females are nearly twice as liable to gall stones as males, owing to their more sedentary habits. Excess in eating and drinking seems to predispose to the formation of these substances; and so does the habit of taking only one meal daily, in consequence of which the gall bladder is not emptied as often as it should be. Moreover, gall stones are thought by some authorities to occur more frequently in individuals of a tubercular, cancerous, or gouty diathesis, than in persons of a sounder constitution.

Calculi are but seldom met with in the branches of the hepatic duct. In this locality they generally present the appearance of small black seeds. They may give rise to dull pains about the liver, sometimes shooting to the shoulder; to symptoms of intermittent fever; to gastric disturbance, with nausea; while as they, for the most part, only cause temporary obstruction to the flow of a small quantity of bile, there is no jaundice. The hepatic duct is rarely blocked up by a concretion. When it is, the symptoms consist of severe spasmodic pains, vomiting, jaundice, and enlargement of the liver owing to the escape of bile from all the ducts being prevented. Sometimes fatal rupture of the hepatic duct has occurred.

Gall stones may be present in the gall bladder without producing bad consequences. Occasionally, however, they set up catarrhal or plastic inflammation, with pains about the epigastrium and right shoulder and hip; loss of appetite, indigestion, and constipation; while now and then ulceration and perforation have occurred. When the calculi leave the bladder and enter the cystic duct they give rise, unless very small, to well-marked symptoms (hepatic or gall stone colic). There is pain commonly of an excruciating character, the patients throwing themselves about the bed, so as to get relief by change of posture; while the right hypochondriac and especially the epigastric regions are very sensitive to pressure. Nausea and vomiting rapidly come on, the ejected matters consisting of half-digested food; the bowels are confined, and get distended with flatus; in thin individuals the distended gall bladder can be felt; there may be rigors, but more commonly only a sensation of coldness; while the pulse is almost always retarded. The larger the stone, the greater will be the suffering and the longer its duration. If the stone recede into the bladder, the symptoms all cease; if it remain impacted, we may have dropsy of the gall bladder, and perhaps ulceration or gangrene of the duct: while when it is forced onwards into the common duct, there is a sense of partial relief. The pain returns, however, when the small duodenal orifice is reached, and complete relief is only obtained when the calculus has passed into the bowel. While the calculus is in the cystic ducts there will be no jaundice, but supposing the common duct be long occluded, jaundice must make its appearance, since there is no outlet for the bile. Attacks of the same character are liable to recur time after time, as biliary calculi are usually multiple. Where the obstruction is permanent the jaundice will gradually increase, the liver progressively enlarges, and the gall bladder becomes much distended; while death will ultimately occur unless the stone be forced into the bowel, or unless it induces adhesive inflammation and gets into the intestine or through the abdominal walls after ulceration and perforation have taken place.

At the end of an attack of biliary colic, the fæces should always be examined for the calculus; a work which can only be effectually done by washing them on a sieve with large quantities of water. Unless the stone come away, it will be apt to lodge in some portion of the small intestine; where it may gradually become incrusted with fæcal matter, and at the end of a few months produce fatal obstruction of the bowels.

Biliary calculi are apt to set up inflammation and ulceration, and so to cause adhesions between the gall bladder and neighbouring parts. In this way gall stones have, as it were, eaten their way through the abdominal parietes, through the coats of the duodenum, and so on. St. Ignatius Loyola, the founder of the order of Jesuits, died in his sixty-sixth year (1556) from the ulceration produced by a gall stone through the walls of the gall bladder into the trunk of the vena porta. Dr. Donkin has related the history of a case where death resulted from the mechanical pressure of a mass of gall stones on the vena porta, leading to obstruction of the portal circulation.

In the treatment of gall stone disease we have first to relieve the pain and other derangements; and secondly, to cause the expulsion of the concretion, as well as prevent the formation of any fresh ones. For the *first* purpose, a hot water or vapour bath will be useful. Then the abdomen should be covered with the extracts of belladonna and poppies (F. 297), as well as with hot fomentation flannels or large linseed poultices. At the same time, a full dose of opium or morphia with ether and tincture of belladonna (F. 315), is to be given; or if there be much sickness the officinal opiate enema, to which thirty drops of tincture of belladonna have been added, must be employed; or recourse can be had to the subcutaneous injection of morphia and atropine (F. 314). The inhalation of chloroform or ether, singly or in combination, is also of great service. Ice should be sucked to relieve the vomiting; unless from the patient's condition it be thought better to encourage the sickness, which can be best done by giving large draughts of hot water containing bicarbonate of soda. With regard to the quantity of opium that may be exhibited, no positive rule can be laid down. The dose must generally be sufficient to relieve the pain, but still it is to be given with caution; while care ought to be taken that it is discontinued immediately ease has been procured. Moreover, when full doses have been employed for a few days in succession, fatal narcotism may occur unexpectedly.

The *second* indication in the treatment—the expulsion of the calculus, is to be carried out by the administration of purgatives. Castor oil, Seidlitz powders, resin of jalap, or the officinal pills of colocynth and henbane generally act well. The only food given during the attack of colic should be milk and broth; under an exclusively fluid diet the biliary passages will be more lax and the secretion more dilute, so that there will be a better chance of the calculus being carried on during the suspension of spasm caused by the opiate. Where there are no active symptoms, and yet it is believed that one or more calculi remain in the gall bladder, and for the prevention of new formations, saline aperients (F. 148, 149) should be persevered with for some time. Remedies for dissolving gall stones are useless. A visit to the springs of Carlsbad (F. 496), Vichy (F. 479), Ems (F. 486), Pullna (F. 497), or Eger (F. 498), may be strongly recommended. In all cases the diet ought to be carefully regulated; stimulants seldom do any good; while such exercise is to be recommended as can be borne without inducing any pain.

IX. JAUNDICE.

Jaundice [from the French *Jaunisse*], or Icterus [from Ἴκτερος = a yellow bird, probably the Loriot—Oriolus flavus—because it was thought that sufferers from jaundice were cured by looking at this bird], is a prominent symptom of many varied morbid actions. Like albuminuria, glucosuria, &c., it is not a separate disease; but rather a symbol indicative of changes going on in important internal organs.

Pathology.—The manner in which jaundice is produced has long engaged the attention of pathologists; and even now further observations and experiments are needed to solve many of the difficulties surrounding this question. According to Dr. Budd, it may be set up in two ways:—1st, by some mechanical impediment to the flow of bile into the duodenum, and the consequent absorption of the retained bile; and 2nd, by defective action on the part of the secreting substance of the liver, owing to which the biliary ingredients accumulate in the blood. Hence we may have jaundice as the result either of obstruction or of suppression.

With regard to the first point there is no dispute, and it is allowed that the greatest number of cases of jaundice are due to the re-absorption of secreted bile. But as to the second hypothesis Frerichs argues that, if it be true, the biliary acids and bile-pigment ought to accumulate in the blood in cases of granular liver, just as urea accumulates in the circulation in granular degeneration of the kidneys. Yet all attempts to detect traces of the essential elements of the bile in the blood generally, and in that of the portal vein in particular, have failed; neither the colouring matter nor the acids of the bile having been found. Moreover, Moleschott kept some frogs alive for several weeks after depriving them of their livers; but no trace of the elements of bile could be detected in the blood, lymph, urine, or muscular tissue. Frerichs therefore suggests that those cases of jaundice which occur without any mechanical obstruction of the excretory ducts of the liver (such as the jaundice of pyæmia, typhus, and snake-bites) are due to an arrested consumption of the biliary acids which have been re-absorbed into the blood, either from the intestine, or directly from the liver. He endeavours to show, that even in health, all the bile formed in the liver does not pass into the ducts, but that a portion of it enters the hepatic veins along with the sugar. The biliary acids thus entering the blood, or which become re-absorbed from the intestine, are supposed to undergo certain changes from oxidation; which may thus account for the quantity of taurine that has been found in the healthy lung, and for pigments which are naturally voided in the urine. When, however, anything interferes with these normal metamorphoses in the blood, it is thought that the complete change of the colourless bile into urinary pigment is arrested, and that the intermediate substance—bile-pigment—is formed in the blood, so as to colour the various tissues and secretions. Now there appear to be great objections to this theory of Frerichs, and especially that the view as to the bile-acids being changed into bile-pigment is quite untenable. It is probable that in many of the cases of jaundice without obstruction in the biliary passages there is formation of bile by the hepatic cells, and subsequent resorption, the resorption occurring in consequence of interference with the circulation through the liver, which gives time for diffusion of the bile through the walls of the bloodvessels. There is still, however, much that is obscure in these cases.

Causes.—It need hardly be said that jaundice is due to some derangement of the functions of the liver. The chief difficulty is, however, in assigning the nature or origin of the derangement in different cases, since this gland is affected by so many dissimilar agencies. By far the most common causes, however, are catarrh of the biliary passages and impaction of gall stones in the common duct. Occasionally tumours of various kinds in the liver or in neighbouring parts, or even an accumulation of fæces in the colon, will compress the ducts and prevent the flow of bile. Cirrhosis, amyloid, and fatty degeneration may give rise to jaundice, but this is not common, nor is it certain how the jaundice is induced. Acute atrophy of the liver is almost always attended with jaundice, congestion frequently so, whether active or passive, and resulting from retarded venous circulation by heart disease or lung disease. Intense anxiety, fright, or a powerful emotion may be followed by jaundice, and it may come on in the course of fevers, especially relapsing fever and malignant remittents, while it is a characteristic feature of yellow fever; it may also occur in pyæmia or pneumonia.

The different diseases which give rise to jaundice have been treated of in the preceding pages, and after all, the point which it is chiefly important to bear in mind is this,—that all forms of jaundice may be included under two heads, those due to suppression of the biliary functions, and those which arise from re-absorption of the secreted but retained bile. After jaundice from obstruction has existed some time, however, suppression likewise occurs; owing to the backward pressure exerted on the hepatic parenchyma by the over-distended bile tubes forming an impediment to the circulation of the blood.

Symptoms.—The symptoms come on gradually or suddenly. In the former case, headache and depression, loss of appetite and nausea, constipation and pain about the right hypochondrium are complained of for a few days before the jaundice is developed. With sudden attacks, the jaundice is the first symptom to attract attention. Then in both instances, the skin and conjunctivæ are found of a yellow colour; the urine has the hue of saffron, or a brownish-black tinge, according to the quantity of bile pigment present; and the fæces are whitish, or of a light clay appearance. A peculiar itching of the skin is occasionally a source of annoyance; there may be exhaustion, drowsiness, giddiness, and peevishness; a bitter taste is sometimes experienced, with thirst; the pulse is often slow; while the function of digestion is more or less interfered with, especially as regards fatty articles of food. The addition of nitric acid, drop by drop, to some urine on a white plate, usually produces the well-known play of colours from brown to green, blue, violet, and red, which is characteristic of the presence of bile-pigment. In some exceptional instances, the corneæ, or the aqueous and vitreous humours have become jaundiced, and then all objects have appeared of a yellow hue. The duration of jaundice varies from a few days to several weeks—or even months.

When the disorder is of long continuance, there may be stupor, delirium, and other indications of cerebral derangement; the patient also becomes weak and thin from mal-nutrition; and frequently there appears to be a tendency to hæmorrhage—as epistaxis, bleeding from the gums, hæmatemesis and melæna, purpura, &c. Supposing there is obstruction from a gall stone, the most acute suffering is induced; the pains being paroxysmal, and often attended with vomiting and hiccup. Should the concretion not pass through the duct, fatal exhaustion may set in.

Treatment.—The treatment of jaundice will of course depend upon the nature of the cause which has given rise to it.

To detail all the remedies which may be called for, would only be to repeat the suggestions thrown out in many of the sections on the various diseases of the liver. It will therefore suffice to say that in jaundice from suppression the secretion of bile may be stimulated by purgatives,—such as mercury, podophyllin and sulphate of soda with taraxacum, &c.; by benzoic acid; by the mineral acids; and by the alkalies, in small doses, taken on an empty stomach, since they excite the flow of gastric juice, which in its turn acts upon the liver and gall bladder.

On the contrary, in jaundice from obstruction, attempts must be made to remove the impediment, and if possible to diminish the activity of the hepatic cells until this has been accomplished. Most frequently a gall stone forms the obstructing body, and the treatment required under these circumstances has been already described. Recourse is to be had to simple aloetic purgatives, or to a mixture of the sulphate and carbonate of magnesia, as well as to mild diuretics. The food ought to be light and capable of being easily digested; while alcoholic stimulants should be avoided. Dr. Harley speaks highly of the use of pig's bile in cases of long-continued obstruction. Two capsules, each containing five grains of the prepared bile (F. 170), are to be given between two and three hours after the meal, when gastric digestion being almost concluded the food is about to pass into the duodenum. The bile thus taken, seems in a measure to supply the deficiency of the natural secretion; the persistent absence of which causes great emaciation with weakness, and ultimately death from exhaustion owing to the imperfect manner in which the food becomes assimilated.

PART X.

DISEASES OF THE PANCREAS, SPLEEN, AND SUPRA-RENAL CAPSULES.

I. DISEASES OF THE PANCREAS.

The pancreas [from Πᾶς = all + κρέας = flesh] is a conglomerate body analogous in structure to the salivary glands, though of a softer and looser texture. With its head embraced as it were by the duodenum, and its duct opening into this intestine, the two organs almost seem inseparable when we try to locate disease in one or the other. In length, the pancreas varies from six to eight inches; while its breadth is an inch and a half, and its weight from two to three ounces. From five to eight ounces of pancreatic juice are secreted daily; this fluid being analogous to saliva, viscid and alkaline, and having a sp. gr. of 1·008. Eberle in his treatise on digestion, published at Würtsburg in 1834, first showed that the pancreatic juice is capable of taking up fat in a very minutely subdivided condition, and of so forming a kind of emulsion. Then in 1848, Bernard demonstrated that fats are acted upon almost exclusively by the pancreatic juice, which forms with them a complete emulsion, and thus prepares them for absorption by the lacteals; all fatty matters passing through the alimentary canal undigested when the pancreas has been destroyed. Bernard also places the pancreatic juice at the head of the list of those digestive fluids which have the property of converting starch into sugar. There is also every probability that the capability of producing fatty emulsions is increased by the mingling of the pancreatic secretion with the bile, as well as with the intestinal juices derived from Brunner's and Peyer's glands, and the follicles of Lieberkühn, &c.

Disease of the pancreas is comparatively infrequent. The symptoms are generally obscure; so that it is commonly impossible to diagnose the exact nature of the affection or its extent, although we can feel tolerably certain that this gland is the seat of mischief from the imperfect way in which the digestion of fatty matters is performed.

The morbid conditions of the pancreas which may be met with are—congestion, hypertrophy, inflammation, suppuration, induration, serous infiltration and softening, fatty and amyloid degeneration, atrophy, simple cystic tumours, obstruction of the duct, hydatid cysts, and either hard or soft cancer. Scirrhus is more common than encephaloid; the latter has been met with at a comparatively early age. Syphilitic gummata have been detected in the pancreas, in connexion with muscular nodes; while it is not altogether unlikely that the cases of amyloid and fatty degeneration have been associated with a taint of this kind. Calculous concretions (composed of carbonate and phosphate of lime, cemented by animal matter) are not uncommonly found in the pancreatic duct or its branches. Such calculi are usually of a white colour, they range in size from the circumference of a pea to that of a walnut, and they exist either singly or in numbers up to fifteen or twenty. All the foregoing affections are generally accompanied by enlargement and tenderness of the gland; while they often give rise to pain in the epigastrium with fulness or hardness, a sensation of heat and constriction, salivation, nausea and vomiting, loss of appetite, inodorous eructations, mental depression, and debility with emaciation. In not a few cases the vomiting has proved exceedingly obstinate; the matters ejected being large in quantity, transparent but rather ropy, and tainted with a slightly sour or saltish flavour. Occasionally a profuse flow of saliva has been a prominent symptom. Where the common choledic duct is pressed upon by a tumour of the pancreas, or is involved in structural disease affecting the head of this gland, there will be persistent jaundice. Fatty stools have also been noticed in connexion with certain diseases of the pancreas, and when present are almost pathognomonic; for if the pancreatic juice is not secreted in due quantity, or if its flow into the duodenum be obstructed, the oily portions of the food will not be reduced to an emulsion, and hence instead of being absorbed must be discharged with the fæces.

The *treatment* of supposed pancreatic disease can only be conducted on general principles; that is to say, our efforts must be directed to alleviating the most prominent symptoms. As regards those cases where the vomiting is troublesome, drugs seem to be perfectly useless. The pancreatic emulsion might be given if the patient can manage to swallow such a nauseous preparation; but I have had no opportunity of carrying this suggestion into execution. In a case related by Dr. Langdon Down,* in which the stools were persistently fatty, pancreatine was given after each meal with success. In one instance of chronic pancreatic disorder, benefit was derived from the employment of enemata containing a little opium and the solution of raw beef (F. 2); together with the introduction of a large seton in the abdominal wall over the seat of the gland. This seton was employed empirically, and in despair from finding all other treatment ineffectual.

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* *Clinical Transactions,* vol. ii.

II. DISEASES OF THE SPLEEN.

The spleen is of an oblong and flattened form, soft and elastic, very vascular, and of a dark purple colour; while in appearance it more resembles the placenta than any other organ. The spleen is situated in the left hypochondrium. The weight is very variable, but averaging six ounces; its length being about five inches, and its breadth rather more than three inches. It is physiologically liable to great variations in size, and is enlarged during digestion, and when from external cold the blood is present in increased quantity in the internal organs. As the spleen has no excretory duct, it is classed with glands similarly constructed (the thyroid, thymus, tonsils, and supra-renal capsules); but whether the ductless glands have all a common function, whether at one time or other of existence some or all of them assist in the elaboration of the blood, are questions not yet determined.

The spleen is not essential to life, since it has frequently been removed in dogs and other animals without fatal results, and without obvious impairment of health. In man this organ has been partially or completely removed in a few instances by injury or surgical operation, and recovery has followed, but a large majority of the cases in which it has been extirpated for disease or in mistake for an ovarian tumour have proved fatal.

The precise uses of the spleen in the economy cannot be definitively assigned. Mr. Gray's investigations led him to conclude that its function was "to regulate the quantity and quality of the blood." It is probably concerned in the assimilation of the albuminoid constituents of blood, and in it red corpuscles which have completed their term of existence appear to undergo disintegration, while white corpuscles are apparently formed. The association of enlargement of the spleen with excess of white corpuscles in leucocythemia is remarkable.

The spleen may suffer from congestion and inflammation, from softening, abscess, and gangrene, which are frequently consequent upon embolism; from tubercular, amyloid, and malignant disease; from syphilitic induration and subsequent disintegration, as well as perhaps from the deposition of gummous masses; from fibrinous deposits—the remains usually of embolic blocks; from the formation of serous and hydatid cysts in it; and also from simple enlargement. Individuals of all ages are liable to the foregoing affections; but they are more commonly met with among the residents of tropical and marshy than of temperate countries. This gland may likewise be congenitally misplaced, and so rendered more than usually liable to injury from pressure, to congestion, &c. In a fatal case of rupture of an enlarged spleen reported by Dr. Buss,* the organ was found resting on the internal iliacus muscle in the left iliac fossa.

It can be readily understood that a structure like the spleen—made up of an elastic fibrous framework (trabecular tissue), of Malpighian corpuscles, and of spleen-pulp—may become over distended with blood from slight causes, and especially from such as interfere with the action of the skin, or of the liver, or of the kidneys. But congestion thus produced is seldom of any consequence, unless from its long continuance the elastic power of the organ gets so reduced that the accumulated blood cannot be urged forward. Probably in cases of the latter kind inflammation may be set up, leading either to softening or to permanent induration.—In cases of suppuration, the spleen generally becomes connected with other organs by firm adhesions. The contents of the abscess can thus make their way through the diaphragm and into the left lung, so as to be expectorated; an instance of which, ending in recovery, has been recorded by Dr. Nasse, of Bonn. So also, the pus may be discharged into the stomach, colon, or peritoneal cavity; while in other cases it obtains an exit through the muscles and skin.—I am only acquainted with a very few recorded examples of tubercular deposit occurring merely in the spleen; but genuine tubercles are not unfrequently found scattered through this gland in the bodies of children who have died from tabes mesenterica, as well as of adults who have perished from general tuberculosis.—Cancer occurs very rarely; while where it has been discovered there has usually existed malignant disease of the liver and mesenteric glands.—When the spleen is ruptured from a blow, severe muscular exertion, &c., death generally occurs, in the course of an hour or two, with all the symptoms of internal hæmorrhage.

Enlargement of the spleen is readily diagnosed by the spreading out of the tumour from the left hypochondrium, by the external smooth and convex surface which the gland presents, by the hilus or vertical fissure dividing its internal surface, by its being carried down by the diaphragm in a deep inspiration, and by the history of the case. The swelling results very commonly from intermittent fever or ague, and is a constant phenomenon of the fit; but chronic enlargement is found as a rule only after several attacks, when it is vulgarly known as ague cake. Splenic enlargement in connexion with a syphilitic cachexia is not so very uncommon in children. An extreme degree of enlargement, often constituting a characteristic feature of this affection, is met with in leucocythemia. The spleen also may be enlarged in pregnant women; the hypertrophy in the latter being accompanied with a degree of softening, so that there is a predisposition to laceration under any extra strain or sudden excitement. Patients affected with tumid spleen can sometimes be immediately recognised by their peculiar sallow and unhealthy aspect, by the dingy discoloration of the conjunctivæ, and the anæmic appearance of the gums and oral mucous membrane. The sufferers are liable to hæmorrhage from various tissues of the body; so that they must be looked upon as unfavourable subjects for even minor operations. There are also various derangements of the organs of digestion, with irregularity of the bowels, and dark-coloured offensive motions; there is muscular debility; and we often find a general unhealthy state of the system, with a tendency to sloughing sores from slight causes. The gland may be tender on pressure; but severe pain is seldom present unless the peritoneal covering be acutely inflamed. In protracted cases, there will be a tendency to general dropsy. If we prick the finger and minutely examine a drop of blood in leucocythemic hypertrophy, the nature of the disorder will be rendered certain by our finding a large excess of colourless corpuscles. Where the blood is much altered from its natural condition, as it often is with this cachexia, we can sometimes detect a systolic cardiac bruit; but abnormal præcordial dulness with cardiac murmur may likewise arise from an enlarged spleen displacing the heart upwards, and preventing the free descent of the diaphragm and full expansion of the left lung.

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* *The Medical Times and Gazette*, p. 530. London, 7th November, 1868.

As regards many splenic affections the disease seems to have wonderfully little effect on the general health; a feature which lends further support to the physiological doctrine that this gland is not a very important one. In some few cases which have been under my care, the enlargement has been so great that the gland has occupied the entire left half of the abdomen; and in these, general debility has been the prominent symptom. The structure of the spleen may not be otherwise than healthy in such instances of enlargement; or the tissues will perhaps be found indurated and the capsule thickened; or numerous cysts, of variable size, have been seen scattered throughout the gland.

When the enlargement is the result of ague, purgatives with bark or quinine in large doses will be necessary. In other cases steel, or the bromide of potassium may prove the most efficacious remedies. Mercury in any form is injurious; and so is depletion. Under all circumstances, the general health must be supported by good nourishing food; as well as by cheerful mental occupation, with residence in a dry and bracing locality.

III. DISEASE OF THE SUPRA-RENAL CAPSULES.

The supra-renal capsules have long been objects of great interest to the anatomist and physiologist; for though they probably perform some important office in the animal economy, yet at present that office has been but vaguely guessed at. Hence we must be content for the time with believing that they serve in some way to minister to the elaboration of the blood, in common probably with the other ductless glands—the spleen, thymus, and thyroid bodies; though the exact nature of their functions, or the manner in which they perform them, cannot even be surmised. All that we know is, that the comparative size of the capsules depends upon the age: they are larger than the kidneys in the embryo, about an equal size in very young children, and only about the twentieth part as large in the adult. Indeed, in the latter, they are sometimes so small that they can hardly be found, though their minute structure is unimpaired. When healthy, they have a yellowish-red colour, are from one and a half to two inches in length, are rather more than an inch in breadth, while they weigh between sixty and one hundred and twenty grains. They have an outer yellow cortical substance, made up of elongated vesicles imbedded in a fibrous matrix; an inner soft brown medullary structure, and a delicate reticulated stroma of connective tissue, the meshes of which are occupied by a number of large pale-coloured cells with round nuclei. The arteries supplying the supra-renal glands are numerous and of considerable size; while the nerves are abundant, have many small ganglia developed on them, and are chiefly derived from the solar and renal plexuses.

The obscurity which surrounds these organs has not been dispelled by the discovery of Dr. Addison, that certain examples of severe anæmia, with a peculiar discoloration of the skin, are due to (or at least are accompanied by) disease of these capsules.* Dr. Addison having observed that cases of marked bloodlessness occasionally came under his care, generally terminating fatally, and presenting certain prominent characteristics, such as excessive and progressive weakness, a feeble and perhaps rapid pulse, faintness on the least exertion, pain in the epigastrium shooting through to the space between the scapulæ, a pearly white appearance of the conjunctivæ, loss of appetite, sickness, flabbiness of the frame rather than emaciation, with a brownish or "singular dingy" discoloration of the whole surface of the body; and finding that no adequate cause (as *e.g.*, loss of blood, diarrhœa, chlorosis, purpura, or renal, splenic, strumous, or malignant disease) could be discovered, for these important symptoms, he gradually seems to have imagined that the fault existed in the supra-renal capsules. Having "stumbled" upon a clue, he set to work to confirm his discovery; and then the more numerous the cases he examined, the stronger his convictions grew.

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* *On Disease of the Supra-Renal Capsules.* By Thomas Addison, M.D., &c. London, 1855.

As in most cases of anæmia, so in the present form (admitted into the nomenclature report of the Royal College of Physicians under the name of *Addison's disease*, or *Bronze skin*, or *Melasma Addisoni*), the disease commences almost imperceptibly with symptoms of failing health and debility. The patient becomes languid and weak, the pulse gets feeble, and the appetite impaired; while the stomach is irritable, the whites of the eyes are pearly, and the body is flabby. From time to time there are attacks of urgent gastric disturbance with vomiting; there are often lumbo-abdominal pains; while at times there are headaches and attacks of vertigo, with other indications of disturbed cerebral circulation. With all or most of these symptoms, for which no adequate cause can be found, Dr. Addison found that a gradual discoloration took place in the skin, most marked usually about the face, neck, superior extremities, penis, scrotum, the flexures of the axillæ, and around the navel. Dark stains are usually seen also on the mucous membrane of the mouth. The skin, in the cases which formed the basis of the observations, was seen to be of a dingy or smoky hue, the depth of colour being variable; sometimes slightly marked, and occasionally—as in one instance, "so universally and so deeply darkened, that, but for the features, the patient might have been mistaken for a mulatto." It is worthy of remark that the discoloration gradually appeared to increase; becoming more marked as the other symptoms acquired greater prominence, and as the disorder approached to its fatal termination. In only one of Dr. Addison's recorded cases does the blood seem to have been examined microscopically; on which occasion a considerable excess of white corpuscles (leucocythemia) was found to exist; this however is not constant.

Since the publication of Dr. Addison's researches, cases of renal-capsular disease have been recorded where there has not existed any discoloration of the skin during life. It is now said, therefore, that the discoloration is not a necessary element of the affection, for it appears to occur only when the case has been of long duration; while when present, it implicates the entire surface of the body, though it commences in the parts most exposed (as the face and hands) and is more marked in the axillæ, over the pubes, &c., than elsewhere, wherever, in fact, there is a normal tendency to pigmentation, and the same may be said with respect to internal organs. But again, it is certain that there may be the most extensive pigment-deposit in the rete mucosum of the skin, without the slightest trace of disease being found after death in the supra-renal capsules. A man died in University College Hospital in the winter of 1858, whose skin had been gradually darkening for a few months previously; the "bronzed" condition being most marked on his admission. It was supposed to be an excellent example of morbus Addisoni; till the scalpel and microscope proved that there was no trace of disease in either capsule.

Blumenbach has quoted from Bomare the case of a French peasant, whose abdomen became entirely black during each pregnancy, while Camper mentions the case of a lady who began to get brown as soon as she became pregnant, and before the termination was as black as a negress. After delivery the colour gradually disappeared. I have also a patient whose skin becomes of a notably darker colour during each menstrual period; though at other times it is darker than it was a few years ago, since which time she has gradually been becoming anæmic. It seems to me that some light might possibly be thrown on this subject by carefully weighing and examining the supra-renal capsules in women who die during pregnancy. The opportunity of doing this has only happened once to me. In this case death occurred from flooding due to separation of the placenta, about a week before the completion of the full term of pregnancy; and in this instance the capsules were evidently enlarged, though they looked healthy. Each mammary areola was unusually dark.

Notwithstanding a few exceptional cases, Dr. Addison's views may be said to be established by the accumulated evidence of recent years.

The supra-renal capsules may suffer from many forms of disease. Occasionally these glands are destroyed by some adventitious deposit, the nature of which can hardly be made out: sometimes there is complete atrophy of one organ, with enlargement and softening of the other: sometimes there has been a deposit of tubercle in one, with a collection of pus in the other: while in other instances there has been fatty degeneration of both glands, or sanguineous engorgement, or apoplexy with one or more centres of extravasation. And again, one or both of these bodies have been found infiltrated with cancer. But according to Dr. Wilks,* it is important to remember, that in true melasma Addisoni the organs get enlarged, and changed into a semi-translucent, grey-coloured, soft, and homogeneous material; which afterwards degenerates into a yellowish-white opaque matter, and subsequently softens into a putty-like matter, or dries up into a chalky mass. The other affections of the capsules do not produce Addison's disease; though it is rather difficult to understand how they can fail to do so, if—as Drs. Addison and Wilks have tried to prove—the symptoms of melasma supra-renale are to be referred to some failure of nervous force acting on the heart, induced by the injury to the ganglionic system of nerves. The duration of life, after the first appearance of the symptoms, has varied in the recorded cases from six months to five years; but according to Dr. Wilks the average is about eighteen months.

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* On Disease of the Supra-Renal Capsules; or Morbus Addisonii—*Guy's Hospital Reports.* Third series, vol. viii. p. 1. London, 1862.

The *treatment* of this affection, whatever its true nature may be, is particularly unsatisfactory, almost all the examples having terminated fatally. Until our pathology becomes more perfect, we can do little more than attempt to remedy the prominent symptoms—the bloodlessness and prostration, the lumbar pains and vomiting, the head symptoms, &c.; for which purpose phosphorus, or the various preparations of steel should be tried, combined with the most nourishing kinds of food that can be taken.

PART XI.

DISEASES OF THE PERITONEUM AND ABDOMINAL WALLS.

I. INFLAMMATION OF THE PERITONEUM.

The peritoneum [from Περιτείνω = to stretch all over] or serous membrane lining the abdominal and pelvic cavities, and investing the viscera, is apt to suffer from acute or chronic inflammation.

1. ACUTE PERITONITIS.

Acute inflammation of the peritoneum is a serious disease, accompanied with pain and swelling of the abdomen, and severe symptomatic fever. It may attack individuals of all ages, and of every rank in life; though it is perhaps seen most commonly among the poor, since they are most liable to the conditions which give rise to it, and cold and damp will induce it in systems enfeebled by bad living. The average annual number of deaths from peritonitis, registered in England during the ten years 1857-66, has been 1554; the greatest mortality (1736) having occurred in 1864.

Causes.—Peritonitis is not often primary and idiopathic. It may be due to mechanical violence, perforation of the stomach or intestines, hernia or strangulation, rupture of the urinary bladder, the bursting of hepatic abscess, &c. It may also arise from extension of inflammation of the organs invested by it, the liver, spleen, stomach or intestines; from disease of the ovaries and uterus; from gonorrhœa in the female by extension of the inflammation along the Fallopian tubes; from pelvic cellulitis; as well as from the contamination of the blood by morbid poisons—especially perhaps by that of erysipelas. It may sometimes be induced by cold and damp.

The peritoneum, like other serous membranes, becomes vascular and of a bright-red colour under the influence of the inflammatory process; a large number of small scarlet patches at first appearing, which gradually coalesce and spread. It loses its glossy appearance and becomes dull and velvety from proliferation of the tissue-elements, and lymph is exuded which at first smears over the coils of intestine and slightly agglutinates them to each other. The morbid action may end in resolution, merely leaving the peritoneum opaque and thickened; or if it proceed beyond a certain stage there will be effusion of serum—perhaps to such an extent as to produce inflammatory dropsy; or coagulable lymph may be poured out causing adhesion between the apposed surfaces of the membrane. In extreme cases the effused fluid is turbid and purulent and in large quantity, and there are flakes of lymph floating in pus or serum; sometimes ulceration has taken place and the large or small intestines have been perforated. The inflammation may be local, not affecting the entire serous lining of the abdomen, and those parts of the peritoneum covering the stomach, omentum, mesentery, and bladder appear less liable to become inflamed than the portions over the convex surfaces of the liver and spleen, the iliac fossæ, and the small intestines.

The earliest *symptom* in many instances is pain; which is at first confined to parts of the surface, but soon extends over the whole abdomen, is much increased on pressure, and is attended with high fever. It is frequently preceded by chilliness and rigors, with a feeling of weakness: in other cases it comes on abruptly, with acute distress in some part of the abdomen—not uncommonly in the hypogastric or one of the iliac regions. The pain is generally exquisitely severe, it causes much depression, and it is aggravated by any movement which calls the abdominal muscles into action,—such as passing a stool, voiding urine, or even taking a full inspiration. An examination can scarcely be borne; pressure, even the weight of light bed-clothes, being insupportable. The patient consequently lies quiet on his back, with his knees bent and the legs drawn up. The abdomen is tense, hot, and frequently tympanitic, and the abdominal respiratory movements are suppressed, either on account of the pain attending them or from paralysis of the diaphragm; the bowels are constipated, and there is often most distressing nausea and vomiting. The skin is burning and very dry at first; but soon the extremities become cold and damp. The pulse is frequent, small, and weak, the respirations are hurried, there may be hiccup, and the tongue is thickly furred. The intestine rapidly becomes distended with flatus from paralysis of the muscular coat, and the resulting tympanites gives rise to painful dyspnœa, chiefly owing to the diaphragm being pushed up by the greatly swollen stomach and bowels. Moreover, the countenance is always expressive of suffering, and of great anxiety. After a time the belly ceases to be tympanitic, although it remains somewhat enlarged from the effusion of serum. When a fatal termination is approaching, the symptoms of collapse increase hour by hour. The abdomen often becomes much distended, the pulse gets very feeble and quick—150 or upwards, the countenance assumes a ghastly expression, attacks of retching and hiccup follow at short intervals, a cold clammy sweat covers the body, and death occurs within eight or ten days from the beginning of the disease.

The fearful malady to which women recovering from child-bearing are liable, termed PUERPERAL FEVER, is very generally accompanied by peritonitis; or perhaps it may be more precise to say that in the most common form of this disease the force of the poison seems to be expended upon the peritoneum. The disease usually comes on about the third day after labour, but sometimes not until the fifth; beginning with one or more rigors followed by fever. The inflammation commences in the uterine portion of the peritoneum, and spreads rapidly over the whole of its surface. In its local symptoms it does not differ from common acute peritonitis, while to the ordinary constitutional results of the latter will be added those of pyæmia. The inflammatory fever seems to result from contamination or poisoning of the blood, either by putrefaction of part of the placenta left in the uterus, or by the absorption of some of the products of inflammation; or it can arise from indirect exposure to the poison of erysipelas, or to effluvia given off by the dead body; or it may be due to direct contagion, as is seen in lying-in hospitals. There is, unfortunately, no doubt that this disease may be carried by a third person from one parturient woman to another (see vol. i. p. 191); and consequently a practitioner when he has attended a patient with puerperal fever, is bound, I believe, to discontinue for a time his attendance upon cases of labour. Changing his clothes, washing his hands with a solution of chlorine or of permanganate of potash or of cyanide of potassium, wearing oil-silk gloves, will not (it is to be feared) prevent him from carrying the poison of this malignant disease about him; and I should therefore recommend that he absent himself from the lying-in room for at least three weeks from the last day of his exposure to the fever. In proof of the justice of these remarks it may be mentioned, as noticed by Dr. Armstrong, that in an epidemic of this disease which occurred in Sunderland in 1813, forty-three women suffered: of these, no less than forty were attended in their labours by one surgeon and his assistant.

In the *treatment* of acute (as well as of puerperal) peritonitis, the patient's diet must at first be restricted to milk, gruel, arrow-root, and beef tea; allowing plenty of diluents, such as iced water, tea, barley water, &c. The greatest quiet ought to be maintained in the sick-room, the air of which should be warm but pure. As I have no faith in the power of antiphlogistic remedies for checking the inflammation, I never resort to them. But we have one remedy which is invaluable, and that is opium. This drug should be given, in grain doses, every three or four hours until the pain is thoroughly relieved; and I believe that by it alone we may often save the patient's life. When perforation of the stomach or intestine has occurred a prompt and free administration of opium offers the only chance of recovery. Sedative fomentations, properly and sedulously applied, also afford great relief; or covering the abdomen with a mixture of four parts of extract of poppies to one of extract of belladonna and then fomenting, will prove very serviceable. As I have adopted this plan of treatment in all my cases for several years, and am fully convinced of its value, I trust that it will be fairly tried without inflicting general bleeding and antimony and mercury on the sufferer. Blisters are most pernicious, though often employed. Even leeches are quite unnecessary; provided the fomentation flannels be applied loaded with steam, and that they are changed every fifteen or twenty minutes. Linseed or hemlock poultices, made sufficiently moist and thick to retain their heat for three or four hours, may be advantageously substituted for the fomentations as soon as the patient can bear their weight without inconvenience. In all instances purgatives by the mouth do harm; but if there be evidence to show that the large intestine is oppressed with fæcal matter, the latter should be removed by one or two enemata. Where great distress is caused by the flatulent distension, puncture of the intestine with a fine capillary trocar affords temporary relief and no evil result need be feared. Directly great exhaustion sets in stimulants must be given; no agent of this class being better than brandy. Essence of beef, cream, milk, raw eggs, full doses of quinine, and ammonia with chloric ether are also often invaluable in staying that prostration which, unless properly treated, soon ends in fatal collapse.

2. CHRONIC PERITONITIS AND TUBERCULAR PERITONITIS.

Chronic peritonitis is sometimes the sequel of an acute attack, though more frequently an independent affection. The inflammation may be partial or general.

M. Louis is of opinion that this disease, when not following acute inflammation, is always complicated with tubercles. On this point, however, Dr. Hodgkin says,*—"My own inspections would lead me also to the conclusion that chronic peritonitis is very frequently conjoined with tubercles; yet this concurrence has not been so uniformly supported by cases observed in this country, as it has been by Louis' cases. That form of peritonitis which is accompanied by copious effusion, and which might easily be regarded as ascites, occurs without any appearance of tubercles. The same may be said of other cases in which the concrete product of inflammation had been more considerable."

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* *Lectures on the Morbid Anatomy of the Serous and Mucous Membranes*, vol. i. p. 149. London, 1836.

Young children, especially such as manifest the strumous diathesis, are very often affected with *tubercular peritonitis.* This disease is by no means confined to them, however, for it is not unfrequently met with in adults between 18 and 25 years of age; particularly in those who, being hereditarily predisposed to phthisis, have led dissipated lives, or have been exposed to great hardships with insufficient food. Upon examining the peritoneum after death its substance will perhaps be found merely studded with miliary tubercles; or there may be a more abundant tubercular deposit, which with lymph glues the coils of intestines together, while it covers the liver and spleen with thick cheesy membranes. Sometimes one or more of the masses of tubercle in their softening give rise to ulceration and perforation of the intestinal coats; a fæcal abscess alone resulting, inasmuch as effusion of the contents of the bowel is prevented by the adhesions which have previously formed. In the same way, different portions of intestine may communicate with each other by fistulous openings, without even fæcal abscess resulting. I have also seen the fæcal abscess lead to perforation of the abdominal parietes—an artificial anus. As a general rule, the mesenteric glands are enlarged and indurated; while, if the morbid action has been of some duration, they will be found softened in their centres.

The *symptoms* of chronic peritonitis are somewhat obscure, the abdominal pain being usually slight. There are often attacks of colic; while at other times there may be fever, with unhealthy fetid secretions and diarrhœa. Generally, treatment gives relief for a time; but at the end of a few weeks the abdomen again gets tender and becomes tense, there is more obstinate diarrhœa with nausea, all desire for food vanishes, the patient wastes rapidly, and the appearance becomes very anæmic. After a time, effusion of fluid takes place, the abdomen enlarges, and fluctuation is felt. When with tubercular peritonitis there is combined disorganization of the mesenteric glands, pulmonary phthisis, &c., the complicated disease rapidly progresses towards a fatal termination.

The *treatment* of chronic peritonitis will consist in paying attention to the functions of the digestive organs, so as to insure correct assimilation; in allowing a mild but nutritious diet, with plenty of milk or cream, raw eggs, and the solution of raw meat (F. 2); and in employing flying blisters or stimulating liniments to the abdomen. Pepsine (F. 420) is oft-times serviceable. The application of the iodine liniment mixed with a little of the aconite or belladonna liniment, or of the iodine ointment diluted with an equal weight of cod liver oil, can be strongly recommended. I think I have seen benefit likewise from the internal use of iodine—particularly the iodide of iron, from bark with sedatives, from the phosphates of iron and lime, &c. (F. 405), and especially from cod liver oil. These cases are, it need scarcely be added, very unpromising.

II. ASCITES.

Ascites [from 'Ασκὸς = a wine-skin or leather bottle,—because of the swollen condition of the belly], or dropsy of the peritoneum, consists of a tense swollen condition of the abdomen, owing to the presence of an excessive quantity of watery fluid in the cavity of the serous membrane by which it is lined.

Causes.—The dropsy may arise from chronic peritonitis; from cirrhosis, cancer, or amyloid or scrofulous disease of the liver, from obliteration of the portal vein causing obstruction to the free passage of the blood through the system of the vena portæ; from acute or chronic Bright's disease of the kidney; from disease of the heart, or of the aorta; from disease and enlargement of the spleen; from malignant affections of the omentum; and from a few other more simple disorders. Cirrhosis of the liver and renal disease are, however, the most common causes.

Pathology.—Ascites may form a part of general dropsy, or it may exist alone. In the former case it may arise from obstruction to the return of blood to the heart by the vena cava, as in disease of the heart or lungs, &c., or from disturbance of the relation between the blood and tissues, as in acute or chronic renal disease. This subject has already been treated of in the remarks on dropsy. Ascites when primary and not merely a part of general dropsy, is generally the result of obstruction in the portal vein, and most commonly the obstruction is due to cirrhosis of the liver, which obliterates its minute intra-hepatic ramifications. Any condition of the liver or adjoining parts, however, which compresses the vena porta or its branches, or disease of the vessel itself, may have the same effect. A chronic congestion of the entire portal system results, and this gives rise to serous effusion into the peritoneal cavity. An occasional cause of ascites is chronic peritonitis or tubercular or malignant disease of the peritoneum. The fluid of ascites is usually clear, of a pale yellow colour like urine, of an alkaline reaction, and loaded with albumen.

Symptoms.—The appearance of the patient is often thoroughly characteristic. The upper part of the body may be much wasted, the features pinched, and the countenance very anxious, while the abdomen is greatly enlarged. On examining the latter it is not only found distended, but the integuments have a shining appearance; while the superficial veins are generally dilated. Fluctuation is more or less appreciable, according to the quantity of fluid and the thickness of the abdominal walls. During the advanced stages there may be considerable dyspnœa, owing to the pushing upwards of the spleen, stomach, and liver. Auscultation of the chest shows that the respiratory murmur cannot be heard as low as in health; that there is tubular breathing in the interscapular regions, especially towards the left side; and that the apex of the heart is elevated, and rather pressed to the left. Frequently there is anasarca—infiltration of limpid serum into the areolar tissue, with the ascites; in most cases the former being confined to the lower extremities, though the face and arms may also be affected, particularly in examples of renal dropsy. The tissues affected with anasarca "pit," on applying pressure. The urine is usually scanty, and often loaded with lithates; while in ascites from cirrhosis it generally contains bile, and in that from renal disease there is an abundance of albumen. The general health gradually deteriorates; while the patient gets weak and emaciated, loses all appetite, is restless at night, and suffers much from mental depression.

Diagnosis.—In typical cases the diagnosis is easy enough; but every now and then the physician meets with an instance where a very thorough investigation is needed to prevent any error. And at the onset I must urge, that in cases of difficulty, whether in the male or female, it is a good plan to empty the bladder with a catheter. By doing so, the examination will often be facilitated; while all chance of mistaking a greatly distended urinary bladder for an abdominal or an ovarian dropsy must be removed.

On examining a case of ascites in which the fluid effused is tolerably abundant, a general fulness of the abdomen can be distinctly noticed. If the patient be standing upright, the fulness will seem to be most prominent below the level of the umbilicus; but by making the subject lie down, the abdomen is seen to become more flat, while both the flanks bulge outwards. When placed on one side, the lowermost part exhibits the greatest prominence. Supposing the quantity of liquid to be excessive, there may be found a general abdominal enlargement, uninfluenced by the posture assumed; while the abdomen will also appear to encroach considerably on the thorax, and the xiphoid appendix with the cartilages of the lower ribs will be much everted. By practising palpation some very characteristic signs are usually discovered. The great evenness of the enlargement, together with the sense of resistance and weight which is experienced on pressing the hand towards the spine, will first excite attention. Then there is also an evident sense of fluctuation communicated to the fingers; the waves being finer, and following more or less quickly upon the impulse in proportion as the distension is great, and the fluid serous or of a watery consistence. Œdema of the abdominal wall, or the presence of much fat, obscures this last sign. Adipose tissue in excess, whether in the omentum or present as a large fatty tumour, has given rise to great abdominal enlargement which has been mistaken for ascites. The sense of fluctuation has been so closely simulated, that patients have even been tapped in these cases of fatty deposit.

On having recourse to percussion in ascites, there will be found, in most cases, well-marked resonance over the higher parts of the belly, owing to the floating of the intestines; thus, as a rule, prominently distinguishing ascites from ovarian dropsy. I say, in most cases, for the distension is sometimes so great that the breadth of the mesentery is not sufficient to allow the intestines to reach the surface of the fluid, or the coils of intestines may be bound down by adhesions formed of coagulable lymph; and then in either instance, dulness must, of course, result. Again, there is occasionally (though very rarely) resonance on percussion in ovarian dropsy. This may happen after tapping, from the cyst filling with air; or it may occur from a communication forming between the cyst and the intestine, and so allowing of the escape of flatus from the latter into the former. I have noticed, however, that ordinarily where there is any real difficulty in the diagnosis of ascites and ovarian dropsy, the mere fact of difficulty may be taken as presumptive evidence in favour of the case being one of ascites. Ovarian dropsy very rarely simulates ascites; and never, save where there is a large unilocular cyst with thin walls. In both diseases there will be dyspnœa, which will be urgent in proportion to the distension. The quantity of the ascitic effusion is sometimes remarkably large. Several years since I was obliged, owing to the severe orthopnœa which existed, to tap a patient in the Hospital for Women suffering from ascites; when 460 ounces of a clear, urinous-looking fluid, loaded with albumen, were removed, the whole of which had been secreted in rather less than one month.

Prognosis.—This is always unfavourable in ascites from organic disease. When the effusion is merely due to the action of cold causing congestion of the kidneys, or to functional derangement of the heart, or to an anæmic state of the blood, the danger is comparatively slight. The supervention of dropsy upon structural disease of the heart, or liver, or kidneys, is always a premonition that matters are advancing towards an unfavourable conclusion. This is not likely to be postponed by the addition, to the primary symptoms, of all those mechanical troubles which must be produced by the presence of perhaps several gallons of fluid within the abdomen. The deaths registered in England as due to pure and simple ascites, average about 750 annually.

Treatment.—Supposing that the cause of the dropsy is remediable, our object must be to remove it. The cases where this can be done, are, however, quite exceptional. We have therefore to try and procure absorption of the fluid; and with this intent recourse is had to drastic purgatives, to diuretics, and perhaps to mercurials. With regard to purgatives, few agents generally act better than the compound jalap powder, in doses varying from sixty to one hundred and twenty grains. Elaterium (F. 157) is often useful; so is calomel with jalap (F. 159), podophyllin (F. 160), gamboge with aloes and blue pill (F. 174), and croton oil (F. 168).

The best diuretics, perhaps, are the acetate of potash, digitalis, squills, and the juice of broom tops (F. 219); or the solution of potash, nitrous ether, and digitalis (F. 220); or spirit of juniper, nitrous ether, and winter green; or digitalis and squills, with blue pill or taraxacum (F. 219, 224); or nitric acid and taraxacum, where a tonic action is also needed. The chloride of ammonium, either singly or with taraxacum (F. 60), has been found useful in Germany. Copaiba, in fifteen minim doses every six hours, or what is better the resin of copaiba, which is the diuretic agent, has proved serviceable in some cases where other remedies have failed. I have seen benefit also from the iodide of potassium, combined with the ammonio-citrate of iron (F. 32,) where there has been evidence of any strumous or syphilitic taint in the system. The leaves of digitalis made into a sort of poultice, or a poultice made with an infusion of the leaves, applied over the abdomen has occasionally induced profuse diuresis when all other measures had failed. As a rule, in ascites dependent upon renal disease, diuretics do harm; while calomel, blue pill, &c., prove especially pernicious. We had better therefore, in such instances, trust to the simplest purgatives, to nitric acid in some bitter infusion, together with frequent hot-air or vapour baths. I have at times found belladonna act favourably in these cases.

When the distension gives rise to much distress, we shall often have to resort to paracentesis. In performing this operation, the individual to be tapped ought to lie upon the left side, along the edge of the bed; and the trocar and cannula should be introduced midway between the umbilicus and pubes. The horizontal position is preferable to any other; since it is the most comfortable to the patient, no pressure is required upon the abdomen, and especially because syncope is much less likely to follow the evacuation of the fluid. After the operation I pad and tightly bandage the abdomen, and generally continue the use of compression for two or three weeks, or even longer where it seems to be beneficial; while at the same time iodide of potassium is frequently given, and occasionally alterative doses of mercury. In spite of all treatment the fluid is usually, though by no means always, resecreted; and in such cases the disease ultimately proves fatal. The advantages of tapping, however, are not only that there is a chance of cure by it, and that the patient's comfort is much increased by the withdrawal of the fluid, but that the liver and kidneys and other abdominal viscera being freed from abnormal pressure are enabled to act more naturally.

III. ABSCESS OF THE ABDOMINAL PARIETES.

Severe contusions of the abdominal walls may be produced by kicks, blows, a fall upon some prominent object, or a squeeze between the buffers of two railway carriages, &c. The consequences are very often serious. A blow sometimes causes death immediately, owing to syncope from the shock to the solar plexus of the sympathetic. In other instances there will perhaps be laceration of some internal structure, with hæmorrhage; the injured individual, often but not necessarily always, dying at the end of a few hours, from the combined effects of shock and loss of blood. Occasionally, the contusion causes rupture of an internal organ, with extravasation of its contents. There need not be any bruise or other external symptom of injury, and yet the tissues of the gall bladder, liver, spleen, stomach, intestinal canal, urinary bladder, or pregnant uterus may be torn. The patient either dies soon afterwards from collapse, or from hæmorrhage; or surviving these dangers, from peritonitis after a longer interval. On the other hand, instances have occurred of laceration of the liver or kidney, where the patients having got over the first effects of the succeeding inflammation have yet fallen victims, at the end of a week or so, to blood poisoning from the absorption of the extravasated fluids. And, lastly, a contusion merely perhaps sets up inflammatory action in a limited portion of the abdominal wall, this action going on to suppuration.

Independently of external violence, an abscess in the abdominal parietes may be due to the extension of disease from other parts. Thus, it sometimes results from inflammation and suppuration of the vermiform appendix of the cæcum, the pus working its way to the surface somewhere about the right inguinal region. So again, suppurative inflammatory action is apt to occur in the connective tissue of the pelvis, or in either ovary, especially in delicate and strumous women; the abscess afterwards pointing in one of the groins, in the hypogastric region, or in the vagina, bowel, &c. Inflammation and suppuration of the adipose and areolar tissues around one of the kidneys (perinephritic abscess) may occur from a blow or fall upon the back, or from some derangement of the general health. In favourable cases the abscess points in one loin; but occasionally the pus burrows amongst the muscles of the dorsal region, and may ultimately be discharged into the ureter, or into the cavity of the peritoneum. Then, finally, a circumscribed abscess may form in the peritoneum, as the result of partial or general peritonitis; the pus, confined by adhesions, either approaching the surface at some part of the abdominal wall, or bursting into the sac of the peritoneum, or into the bowel, &c.

The *diagnosis* of abscess in the abdominal wall is not always so easy as might be imagined; except, of course, in those cases where the tumour is prominent and has softened, allowing fluctuation to be readily detected. Spasmodic contractions of portions of the abdominal muscles are very apt to occur under the influence of emotion, palpitation, &c., the tense parts communicating to the hand of the examiner a feeling very much like that of a tumour. The rectus muscle on either side, traversed as it is by from three to four tendinous intersections (the lineæ transversæ), often contracts in one or two divisions and gives an erroneous sensation to the hand applied over it. Steady pressure, together with the withdrawal of the patient's attention from the proceeding, will often relax the muscular fibres and prevent any erroneous conclusion being drawn. An abscess in the epigastric region can be sometimes seen and felt to pulsate, owing to the force derived from the aorta. But this generally occurs in thin subjects; the pulsation ceasing if the tumour be lifted up, or if it be gently moved to one side away from the influence of the deep vessels. Disease of the liver, hydatid tumours, and a distended gall bladder, have given rise to the impression that an abscess was present in the right hypochondriac region; while enlargement of the spleen has acted in the same manner on the left side. And, lastly, a bladder distended with urine has been mistaken for an abscess, until further inquiry has led to the use of the catheter.

The *treatment* of abscess in the abdominal wall is not very difficult; for, directly the practitioner is certain that pus is present, a free incision should be made into the most prominent part of the tumour to permit of the ready escape of the matter. If there be merely a hard circumscribed swelling, however, attempts can reasonably be made to check the inflammatory process and to ensure resolution, by rest, fomentations, and the administration of the carbonate of ammonia with bark (F. 371). In cases where suppuration has become established, and the abscess has not been opened, fæcal fistula has sometimes resulted; the pus making its way externally, and at the same time burrowing backwards, until the ulceration has extended into a portion of adherent bowel.

IV. PHANTOM, OR MUSCULAR TUMOURS.

The fact has just been noticed, in the preceding section, that spasmodic contractions of portions of the abdominal muscles are apt to give rise to a feeling as if a well-defined tumour were under the hand of the examiner. But in alluding to this circumstance, attention was more particularly directed to those instances where only the muscles of the anterior wall of the abdomen take on this curious action under the influence of manipulation. The cases now to be treated of are much more remarkable; for in them it would seem as if all the abdominal muscles, but more especially the diaphragm, were concerned in producing an appearance exactly resembling that caused by a large foreign body.

As far as my experience goes, these large phantom tumours occur only in the female sex. The pseudo-growth varies in size from an ordinary melon to that of a fœtus at the full term. In some women the enlargements give rise to many of the symptoms produced by gestation; so that we have the condition known as spurious pregnancy,—the *grossesse simulée par illusion pure* of French writers. Occasionally, the imaginary gestation is followed by a spurious parturition; and I have seen a lady walking about her apartment, with sharp and frequently recurring pains of labour, and surrounded by all the paraphernalia of the lying-in room, where there was no pregnancy nor even a real abdominal tumour.

The muscular tumours which simulate disease will appear entirely or partially to fill the abdominal cavity. They are either stationary and firm and unyielding, or they change their relative position from day to day, or they seem moveable and as if attached by a long pedicle. Moreover, they may be insensible to the touch, or acutely tender; and they perhaps temporarily melt away under the influence of steady and prolonged manipulation, or they disappear for many days or even weeks and then return, or they remain persistent for years.

The question naturally arises—What is the *nature* of the abdominal swelling in this affection? It was long thought that the symptoms of phantom tumours or of spurious pregnant uteri were due simply to the distension of the intestines by flatus, combined with the excessive deposition of fat in the abdominal integuments and in the omentum. We are told, that on examining the body of Joanna Southcott after death, the womb appeared smaller than natural, free from disease, and containing neither "the promised Shiloh, nor any other fœtus;" but the walls of the abdomen were four inches thick from fat, the intestines were distended with gas, and the omentum was one large mass of adipose tissue. Very possibly the combination of these conditions may alone have sufficed to produce the disorder in other instances; but without a doubt in the majority of cases there is something more. This additional something is probably irregular or excessive action of the diaphragm and other abdominal muscles, by which the intestines are forced low down in the cavity of the abdomen. In many instances also, it has been thought that irritation or chronic inflammation of one or both ovaries existed; this irritation producing contraction of the muscles by reflex action. And again, it has not unfrequently been found that the patient was suffering from some displacement of the uterus—retroflexion, or anteflexion, or retroversion.

That the *diagnosis* is often a matter of difficulty is certain from the serious mistakes which have been made by eminent men. In the statistical account of eighty-one cases of ovariotomy collected by Mr. Benjamin Phillips,* it is shown that in as many as five instances no tumour at all was found upon cutting into the abdomen; and at least two more examples of this blunder have occurred since this gentleman's report was published. When these swellings seem to shift their position, they have now and then been mistaken for moveable kidneys. It is well known that occasionally both the renal organs present an unusual degree of mobility; or one kidney may be moveable to a considerable extent, while the other is stationary. So also a spleen displaced downwards can form a palpable tumour, as low as the left iliac region; while should there also happen to be any displacement or hypertrophy of the pancreas, a very puzzling enlargement will result.

The chief points, by attention to which the practitioner can reasonably hope to avoid error, are the following:—(1) As the patient lies upon her back, with the abdomen exposed, there will be all the appearance of a solid tumour: nevertheless, on practising percussion, a resonant sound will generally be obtained. This test, however, is often rendered uncertain by the excessive deposition of fat in the abdominal walls or in the omentum; while there may be such great intolerance of pressure, that it will be hardly possible to make a satisfactory tactile examination. (2) There is usually a considerable arching forwards of the lower dorsal and upper lumbar vertebræ; so that the practitioner can easily pass his hands under the patient's loins. (3) Very often, positive symptoms of ovarian or uterine irritation are present. The chief of these consist of tenderness on manipulation over one iliac region, or above the pubes; irregularity or suppression of the catamenia, with an abundant leucorrhœal discharge; piles and tenesmus, or troublesome irritability of the bladder; intense and almost constant backache; and neuralgic pain extending down one leg, combined perhaps with retraction of the limb. And (4), if the patient be slowly, but thoroughly placed under the influence of chloroform or of ether, the abdomen will be seen to flatten and the tumour to entirely subside; the latter slowly melting away, in proportion as the anæsthetic relieves the diaphragmatic and abdominal muscles from the influence of the reflex nervous action. As consciousness returns, however, the muscles become tense and prominent, and the swelling gradually forms again; until the tumour is found possessing all its original characters, by the time the insensibility has completely passed off.

The general *symptoms* presented in these cases demand a short notice. The patients are generally in bad health, being often anæmic; while they are also sufferers from those varied phenomena which are so constantly set down as due to hysteria, or to the so-called "spinal irritation." They are not unfrequently the victims of neuralgia; and they either have amenorrhœa, or dysmenorrhœa, or leucorrhœa. They suffer from mental anxiety, independently of the uneasiness produced by their health. The digestive functions are ill-performed, and the bowels are consequently constipated. The disposition is often tranquil; the patients like to be quiet and rather shun the society of their friends; and, if allowed, they will pass much of their time in bed. Doubtless, in some cases, bad practices are resorted to. But in none of the examples which have fallen under my notice have there been any indications of an attempt at feigning disease. Indeed, the swelling always gives rise to great general uneasiness and mental depression, and is the cause of advice being sought.

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* *Medico-Chirurgical Transactions*, vol. xxvii. p. 468. London, 1844.

The *treatment* of these phantom tumours requires to be carried out with care and patience. Where there is any chronic inflammation or irritation about the uterus or ovaries, the morbid state must be removed according to the rules which are laid down in the subsequent pages of this volume. Until the uterine functions are naturally performed, it will be useless to hope for much benefit. Then, the general health is to be improved; which can generally be effected by the employment of bark and one of the mineral acids, or of ferruginous tonics, or of zinc with strychnia or nux vomica, and of mild aperients. A good nourishing diet must be allowed; while the power of the digestive organs is to be restored by pepsine or other drugs. It will often prove of great advantage if the patient can be sent to the seaside. The nature of the case ought to be fully explained to her; while she must be led to feel confidence in the ability of her physician to effect a perfect cure. And lastly, the abdominal muscles are to have their abnormal irritability removed by the frequent use of galvanism, by shampooing, by giving support to them with a well-adjusted belt, and by the employment of tepid salt water baths.

PART XII.

DISEASES OF THE URINARY ORGANS.

UNDER this head it is proposed to treat of the diseases of the kidneys, ureters, and bladder.

The kidneys are ovoid bodies, deeply situated one on each side of the vertebral column, in the lumbar region. Each kidney is about four or five inches long, and two broad; the weight varying between four and six ounces. Each gland receives blood from the aorta by the renal artery. From this blood, as it flows through the kidney to be carried back by the emulgent vein into the inferior vena cava, the ingredients of the urine are separated or formed. The average quantity of urine passed per diem is about two pints. It should be transparent and of a pale sherry colour; should have a specific gravity of about 1020, and a faintly acid reaction.

It consists of water holding in solution inorganic salts, urea, urates of ammonia, soda and lime, with other organic substances and colouring matter. The water holding in solution some of the inorganic salts distils from the Malpighian tuft of blood-vessels into the flask-like dilatations of the tubes in which they are enclosed; while the characteristic urinary substances are secreted by the epithelial cells of the convoluted tubes, and are carried off by the water flowing through them.

The urine affords valuable indications of the general condition of the system as well as of disease of the kidney and urinary tract by variations in quantity, colour, specific gravity, and reaction, and by deposits of various kinds. Many deviations from the usual condition of the urine are perfectly compatible with health, and are explained by physiological considerations.

The *quantity* will be greatly influenced by the amount of fluid drunk, and by the amount passing off from the skin and by the bowels. It will be large when much fluid is taken, and *vice versâ*, will be diminished by free perspiration, whence more urine is passed in winter than in summer; it will be diminished again by diarrhœa. It is well known also that certain foods and drinks promote the flow of urine.

The *colour* will usually vary inversely with the quantity, being pale when the amount passed is large, and darker by concentration when it is small. Much nitrogenized food increases the solid constituents of the urine, and consequently makes its colour deeper and the specific gravity higher. The *specific gravity*, like the colour, varies inversely with the quantity passed, and when it is wished to estimate the amount of urinary solids excreted, note must be taken both of quantity and specific gravity. In diabetes the quantity is large and the specific gravity high; in contracted granular disease of the kidney, the quantity is above the average, but the specific gravity is low.

The *reaction*, which is normally acid, may be rendered alkaline by non-nitrogenized food, or by food containing a large proportion of vegetable salts of potash. It is also temporarily alkaline for a short time after a meal. Alkalinity not accounted for in this way may be due to ammoniacal decomposition of the urine or to the presence of fixed alkaline salts in excess.

Not only may there be variations in quantity, colour, reaction, and specific gravity, but deposits may be present without any departure from health. The urates are only sparingly soluble in cold water, and in the presence of an acid; when therefore the urine is concentrated, either in consequence of little water being drunk, or of much food having been consumed, or from perspiration or diarrhœa, it may deposit urates on cooling; or in very cold weather the urates may be thrown down when in proper proportion to the water; or a slight excess of acid may cause them to be precipitated when not themselves in excess. The phosphate of lime again, which is a normal constituent of the urine, is insoluble in water, but in the urine is held in solution by the acid phosphate of soda; when this is neutralized by food or otherwise, and the urine is rendered alkaline, the lime salt is precipitated without there being any disease.

The most important urinary deposits are as follows :—

1. *Urates* of soda, potash, lime and ammonia, often extremely copious and appearing as the urine cools. They are redissolved by heat or alkalies or by addition of water, not by acids which set free uric acid. Under the microscope they appear like groups of dark granules, sometimes mixed with minute spiked balls, considered to be urate of soda.

Urates may be deposited in a state of health, as mentioned above, when they are generally pale; they are present in most febrile disorders, but especially in rheumatic fever, when they are usually of a red colour, sometimes like brickdust; they are seen also in wasting diseases, as of lungs and liver, and are then often pink; while they often accompany dyspepsia and debility, being mostly pale. The varying colour is due to changes in the urinary colouring matters which stain the lithates.

2. *Uric acid*, usually visible in the form of crystals of a yellow or red colour, not as a rule present as such when the urine is secreted by the kidneys, but precipitated from its combination with one of the bases mentioned above by some acid, either in the pelvis of the kidney, the ureter or bladder, or after the urine is passed.

When the precipitation takes place within the body, the crystals form gravel or sand, according to the size of the concretions formed by the crystals. Uric acid does not often form a very copious deposit; it is much heavier than the urates, is insoluble by heat or acids, but soluble by alkalies. It presents under the microscope a great variety of crystalline forms, usually modifications of a rhombic prism, and almost invariably coloured by the urinary pigment.

Free uric acid is most commonly met with in gouty states of system, or when the liver acts imperfectly. Precipitation within the urinary passages can generally be prevented by the administration of the carbonate or citrate or acetate of potash, or of some similar salt of lithia. The tendency to excessive formation of uric acid must be corrected by remedies appropriate to the particular condition of system from which it arises.

3. *Oxalate of lime*, rarely distinctly visible to the naked eye, but appearing under the microscope either in the form of octohedra or of dumb bells. The former are apparently gradually precipitated after the urine is secreted, and usually increase in number and size from day to day for some time after it is passed; the latter are apparently formed in the renal tubules themselves and not afterwards. Oxalates are not stained by the colouring matter of the urine, but are colourless and bright. Oxalates may be due to food containing oxalic acid; when not so caused they are usually associated with a depressed condition of the system, nervousness, dyspepsia, and often with an excess of urea or urates in the urine.

Acids and tonics are usually required in oxaluria.

4. *Phosphates* appear in the urine under two distinct conditions:—(1) When the urine has been retained and has undergone ammoniacal decomposition, the ammonia combining with the phosphate of magnesia to form the ammoniaco-magnesian phosphate, and also causing the precipitation of phosphate of lime. (2) When the urine is rendered alkaline by salts of potash or soda. The latter condition is usually associated with weakness, depression, and dyspepsia; the former is merely an indication of local disease in the genito-urinary tract. At one time phosphatic deposits were considered to indicate a particular condition of system which was called the phosphatic diathesis.

Phosphate of lime forms a pale, heavy, amorphous deposit, differing from urates in being insoluble by heat and alkalies, and by dissolving on the addition of acids. Under the microscope they present fine granules. The ammoniaco-magnesian phosphate takes the form of beautiful triangular prisms, which are colourless and transparent. They have been called knife-rest prisms, from their resemblance to the prisms of glass sometimes used as knife-rests.

Other urinary deposits, such as cystic or xanthic oxide, or hippuric acid, are rare and need not be described here, while mucus, blood, and bile appear in the urine under circumstances considered in treating of the diseases in which they occur.

From time to time subjects are met with in which there are three kidneys, and I believe that four have been discovered. When the number of these glands has been natural, their situation has in a few instances been found to be unnatural; both kidneys having been seen lying close together on the left side. A more frequent abnormality is the presence of only one kidney, which seems to be placed indifferently on the right or left side, and is generally more or less enlarged—perhaps very considerably, so as to weigh four or even five pounds; while it may possibly have two ureters, and either one large renal artery and vein, or two or three arteries and the same number of veins. Again, the two glands are now and then united together; the junction occasionally being formed by a flat band of true renal tissue extending across the vertebral column, producing the so-called "horseshoe kidney." Sometimes the fusion of the two organs into one is still more complete; and then a large kidney is found lying in the median line, rather than in one of the lumbar regions. And besides, one kidney may occupy its normal site, while the other is moveable; or in a very few instances, an extreme mobility of both the glands has been found. The moveable organ can be detected, feeling like a tumour; it may generally be shifted to a certain degree, downwards and forwards; and compression with the hand usually gives rise to a peculiar faint or sick sensation. Lastly, the infant born dead at the full term, as well as the prematurely expelled fœtus, has been found destitute of any kidneys, on several occasions; while one almost incredible case has been recorded by Dr. Moulon,* physician to the Hospital at Trieste, of a girl living to be fourteen years of age, who had neither kidneys nor ureters nor urinary bladder. In this extraordinary instance, the liver was supposed to act vicariously; inasmuch as the umbilical vein proved to be enlarged, and there was a constant dripping of urinous-smelling fluid from the umbilicus which was situated just above the mons Veneris. The girl died from causes independent of her anomalous structure.

One or other kidney has been removed by surgical operation several times—by Simon of Heidelberg successfully for a fistula of the ureter, by other surgeons for renal calculus or in mistake for an ovarian cyst or other tumour, usually with fatal results.

Occasionally, the trunk of one renal artery is blocked up by an embolus, or its canal is nearly obliterated by some malformation or the pressure of a tumour; under which circumstances the corresponding kidney undergoes degeneration, and has its work performed by the opposite gland. The effects of suppression of urine (*ischuria renalis*) when both glands cease to act, have already been described in the section on uræmia.

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* *Archives Générales de Médecine*, tome xvii. p. 424. Paris, 1828.

I. SUPPURATIVE NEPHRITIS.

Suppurative nephritis [from Νεφρὸς = the kidney; terminal -*itis*], or acute inflammation of the substance of the kidneys, sometimes sets in without any appreciable exciting cause, especially perhaps in strumous subjects. More frequently it arises from exposure to cold and damp, from the formation of calculous matter, from various mechanical injuries, from poor living combined with intemperance, and from the abuse of diuretics: as well as from the administration of such renal irritants as copaiba and cubebs, cantharides and oil of turpentine, &c. It is comparatively a rare disease. As in inflammation of other organs, so in the kidney the morbid action may end in resolution, or it will go on to suppuration; in the latter case abscesses of a variable size resulting, which sometimes cause entire destruction of the gland. In most examples of nephritis, the mucous membrane lining the pelvis and infundibula is involved in the disease; inflammation of this tissue being known as *pyelitis* [Πύελος = a trough; terminal -*itis*].

The *symptoms* of nephritis are chiefly these:—Deep-seated pains in the loin on the affected side, more especially in the region of the kidney; the pain sometimes extending along the ureter to the neck of the bladder, or to the groin or scrotum or testicle, and being increased by pressure or by exercise. There is often also numbness of the thigh; and, in men, retraction of the testicle on the affected side. In addition, there is much constitutional disturbance,—usually indicated by shivering, fever, nausea and vomiting, with great thirst; a hard, frequent, and full pulse; as well as by constipation and tympanites. Occasionally complete suppression of urine takes place; but more commonly, though the desire to empty the bladder is frequent and urgent, yet the secretion is scanty and high coloured, and often contains blood and pus corpuscles.

The *prognosis* during the acute stage is always grave; while if this period be survived, there is still great risk from the changes produced in the glandular structure. The morbid action, if severe, may cause death by the general constitutional disturbance which it sets up. Sometimes it proves fatal at an early stage, by inducing coma; owing to the retention of urea in the blood, and the consequent poisoning of the system. In other examples, again, typhoid symptoms appear, and the patient gradually sinks from pure exhaustion.

The *termination* of the inflammation in suppuration is much to be feared. If, fortunately, the mischief should end in resolution, the sufferer appears to get well; although the gland is often left somewhat indurated, and thus perhaps is laid the foundation for future disease. But where one or more abscesses form, then they lead frequently to ulceration, perforation of the capsule, the formation of renal fistulæ, and the establishment of a purulent discharge; these consequences being accompanied by a prostrating hectic fever, which most times ends fatally after a longer or shorter interval. In a few more favourable cases, however, the pus passes out by the natural passages, and is found in the urine sometimes in very large quantity; not unfrequently continuing to be thus discharged either at intervals or continuously for months or even years, before a complete cure (or death) takes place.

The kidney is liable to be affected by *disseminated suppuration* from retention and ammoniacal decomposition of the urine caused by stricture, prostatic disease, stone in the bladder, &c., or when the bladder is paralysed from injury or disease of the spine. This form of disease has been called the surgical kidney, from the fact that it is a frequent cause of death after operations on the bladder or urethra, and has frequently been described by surgeons. A full account of it has been given by Dr. Dickenson,* who shows that it has its origin in an ammoniacal and putrid state of the urine however induced, poison from which is conveyed by the veins into the substance of the kidney, there setting up the disseminated suppuration. The symptoms are general rather than local. There may be pain in the loins but this is often absent, while there is shivering, fever of typhoid character, sometimes with profuse perspiration, vomiting, and occasionally hiccup or diarrhœa. The disease is usually rapidly fatal.

The *diagnosis* requires care, lest the suffering from congestion and inflammation be confounded with that which arises from mechanical irritation of the kidney, perinephritis, spinal disease, or lumbago. Now touching irritation of the kidney from a stone—calculous nephralgia—the symptoms of this closely resemble those described. But as the calculus passes along the ureter to the bladder, the local suffering is much greater than in nephritis, while the systemic disturbance is less. The sudden relief which follows the entry of the stone into the bladder, will reveal the true nature of the attack when there has been any doubt. Then in respect to perinephritis [Περὶ = around + νεφρὸς; terminal *-itis*], and spinal disease, the symptoms are less acute, come on much more insidiously, and give rise only to pain in the affected part, the bladder seldom being irritable, while there is no retraction of the testicle. And so with regard to lumbago, we find neither nausea nor vomiting, the appetite remains unaffected, the bowels are not constipated, and there is no fever. Furthermore, the urine does not contain renal casts, nor albumen, nor pus; although it may be loaded with urates.

On making an examination of the urine for pus, reliance is mainly to be placed on the evidence obtained by the microscope, and partly on that derived from a chemical analysis. Pus corpuscles are round, pale, granular, and indistinctly nucleated. Under the influence of a drop of dilute acetic acid they lose their granulated appearance, swell considerably, and have their nuclei made much more distinct, and usually at the same time fissured. An instrument with a $\frac{1}{4}$-inch object-glass will suffice for the examination, though the $\frac{1}{8}$ of an inch glass is better.—The best chemical test for pus is the solution of potash (KHO according to the new method of notation); on the addition of which a muco-gelatinous mass is formed, more or less viscid according to the proportion of the abnormal ingredient. Nitric acid (HNO_3) also shows the presence of a small quantity of albumen, which is derived from the serum of the pus. The fact must not be overlooked, however, that the detection of pus in the urine is by no means a proof that the secreting structure of the kidney or its pelvis is affected; for the purulent matter may be derived from the mucous lining of the urethra, bladder, or ureters. In women suffering from leucorrhœa, a small quantity of pus is often found, which has its origin in the lining coat of the vagina. Moreover, an abscess situated in other parts occasionally bursts into the urinary passages; as examples of which can be mentioned a psoas abscess opening into one ureter, the pus in pelvic cellulitis making its way into the bladder, a prostatic abscess discharging its contents into the urethra, &c.

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* *Medico-Chirurgical Transactions*, vol. lvi. p. 223.

The *treatment* of nephritis ought to consist in the use of poultices or fomentations to the loins, frequent hot hip-baths medicated with extract of poppies, the vapour or hot-air bath, mild purgatives, and diaphoretics—especially those containing opium, such as the compound powder of ipecacuanha made with the nitrate instead of the sulphate of potash. Our object, indeed, should be to rest the inflamed gland; and to get its work done by the skin, and by the mucous membrane of the bowels. Among the various purgatives, few will answer better than the resin of jalap; two or three grains of which, with half a grain of the resin of podophyllum, will usually act well in spite of the constipating effect of the opium. The patient had better be kept warm in bed; his diet ought to be low, with a free allowance of simple diluents; while if there be urgent sickness, sinapisms may be applied to the epigastrium, and ice given to suck.

As soon as symptoms of prostration set in, or immediately there are any indications of suppuration, support must be had recourse to. Milk, cream, raw eggs, essence of beef, cod liver oil, and the liquid extract of bark are all of great service. Solid food is to be freely allowed directly there is sufficient power to digest and assimilate it. When there is great irritation of the bladder from the contact of the pus, relief may be afforded by washing out this organ with a weak solution of carbolic acid.

II. ACUTE BRIGHT'S DISEASE.

During the year 1827, Dr. Richard Bright first pointed out the frequent connexion of anasarca and other dropsical affections with albuminuria and a degeneration of the structure of the kidneys; the prominent character of which degeneration was believed to consist in the deposition of a peculiar granular matter in the substance of the renal gland, together with the gradual atrophy of its cortical and tubular structure. Since this time the pathology of these diseases has engaged the attention of several of the most distinguished workers in the profession; the revolution which has taken place in our views concerning albuminuria and its causes being due to the chemical and microscopical investigations, as well as to the clinical studies of Bowman, Christison, R. B. Todd, John Simon, George Johnson, Owen Rees, Virchow, Parkes, Goodfellow, Basham, George Harley, Begbie, Rosenstein, Wilkes, William Aitken, Lionel Beale, Wm. Roberts, W. H. Dickinson, and Grainger Stewart. To perpetuate the honourable name of the physician who originally proved the association of renal disease with albuminuria and dropsy, the Fellows of the Royal College of Physicians of London have decided by their Provisional Nomenclature Report that all kidney diseases which are productive of albuminuria shall be classed together under the head of Bright's disease. Of this there are, as will now be explained, two forms—the acute and chronic; the latter including three distinct affections.

Acute Bright's disease, or acute albuminuria, or acute desquamative nephritis, or acute renal dropsy, or acute tubal nephritis, is a very important disorder which may originate from several causes—as intemperance, starvation, exposure to wet and cold, erysipelas, and the cholera poison, &c.; but especially is it often due to scarlet fever.

Pathology.—Acute Bright's disease consists essentially of an affection of the epithelial or gland cells lining the convoluted uriniferous tubes, probably induced by their having to eliminate from the blood some matter which is not naturally excreted by the kidneys; or if natural, is present to a morbid excess. The cells, having their functions thus modified, suffer changes as regards their nutrition; they proliferate with undue rapidity; while from their rapid desquamation they tend to check secretion by mechanically obstructing the tubes. During the time that the gland cells are undergoing these changes, the materials which ought to be withdrawn from the system by the kidneys are more or less retained; their accumulation in the blood increasing its deterioration, so that this again aggravates the original mischief. The circulation through the vessels of the Malpighian tuft also becomes impeded; and consequently an effusion of serum and fibrin takes place into the cavities of the tubes. The serum which exudes from the congested Malpighian capillaries mingles with the urine, and renders this fluid albuminous; while the fibrinous material solidifies, entangles in its substance the cast-off epithelial cells, and escaping with the urine is detected in this secretion in the shape of epithelial tube-casts. If any of the walls of the vessels give way, as they will do under the influence of the pressure to which they are exposed, blood corpuscles will also be found entangled in the casts, while the urine will present a dark-coloured sediment. It has been shown by Mr. F. A. Mahomed that a high degree of arterial tension precedes the occurrence of these changes in the kidney, and is probably an intermediate step in their production, while with this arterial tension and before the appearance of albumen, some of the crystalloids of the blood can be detected in the urine by means of guaiacum and ozonic ether.

In the event of the disease terminating fatally, both kidneys will be found much congested. They are usually considerably increased in size and weight, are of a pale yellow or even cream-coloured hue, and are marked with irregular extra-vascular patches. Minutely examined, the convoluted tubes of the cortical portion of the gland are seen to be widened and crowded with desquamated epithelial cells, with blood corpuscles, and with amorphous granular matter; some tubes being more distended than others, and having their channels completely blocked up. The straight tubes of the medullary cones are comparatively unaffected. The Malpighian bodies are found engorged.

Every now and then it happens that the subject of general dropsy with albuminuria has no desquamation of the renal epithelium; just as cases of scarlet fever, small-pox, &c., are met with in which the eruption is very slight or entirely absent. In these examples of *non-desquamative disease of the kidney*, there are often prominent symptoms of blood-poisoning; owing as Dr. George Johnson has shown to some failure and imperfection in the effort to eliminate the morbid material from the system.

A few years since, Dr. Basham expressed his doubts as to the correctness of the terms desquamative and non-desquamative nephritis. He suggested, as more applicable, the names of acute and chronic albuminous nephritis; or (out of respect to the distinguished physician who first discovered this form of disease) that of morbus Brightii in its acute or chronic form. Dr. Basham well remarked that this copious shedding of epithelium is common to all free epithelial mucous surfaces, when they are the seat of inflammatory engorgement or irritation; and that consequently we might as reasonably speak of desquamative bronchitis, or of desquamative catarrh, as of desquamative nephritis.* Allowing the justice of these observations, it might still have been urged that the mechanical consequences of the desquamation are so much more serious in the case of the kidneys than of the bronchi, that extra attention could well be fixed upon the occurrence in the former instances. The difference between catarrhal inflammation of a mucous surface which is free, and one which lines minute complex canals must be obvious to every one. In the first case, there is no trouble in the membrane getting rid of any quantity of cast-off cells and morbid secretions: in the second, these products can only be eliminated slowly and with difficulty, while by their presence and accumulation they are obstructing important passages and embarrassing the action of the whole gland. The soundness of this plea, I venture to think, remains good, even though it be rendered unnecessary owing to Dr. Basham's views having been adopted by the London College of Physicians. And since the advantages of one uniform system of nomenclature are obviously so great, it cannot be wise to be hypercritical as to the names employed, provided we are all agreed about the nature of the diseases to which they apply.

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* *On Dropsy connected with Disease of the Kidneys* (*Morbus Brightii*), *&c.* Second Edition, p. 20. London, 1862.

Symptoms.—As a general rule, acute Bright's disease is ushered in with rigors and chilliness. These symptoms are soon followed by feverish reaction, headache, restlessness, a sense of weight or dull pain with tenderness in the loins, and nausea or even vomiting. The dropsy which it gives rise to is an early symptom: the face first becomes puffy, followed by general swelling of the connective tissue throughout the body, and sometimes by effusion of fluid into the pleuræ or one of the other serous cavities. In extremely rare instances there is no dropsy; the absence of this being due, according to Dr. George Harley, to only one kidney being attacked. So long as one gland can act and prevent the accumulation of urinary materials in the blood, dropsy does not set in. Whether, however, any anasarca be present or not, there is a frequent desire to pass urine, which is usually very scanty, of a dark smoky colour, and on being tested by heat and nitric acid proves to be highly albuminous. Later the urine becomes paler, and as the disease takes a favourable turn very abundant. Examined microscopically, it is seen to contain tube casts of coagulated fibrin, epithelial casts and cells, blood corpuscles, exudation cells, and occasionally crystals of uric acid. The fibrinous casts may be large or small according as they have been formed in a tube which has been denuded of its epithelium, or in one in which the epithelium remains. Blood corpuscles are usually most abundant in the early stage, and may be free or entangled in casts. The exudation corpuscles vary in number in different cases. The epithelial casts and cells sometimes enclose a small quantity of fatty matter; but as fatty change is common in inflammatory products, this circumstance need not lead to an unfavourable prognosis unless a large proportion of the cells are seen distended with oil, when it must be feared that the kidney is passing into a state of fatty degeneration. The more acute and extensive the renal mischief, the greater is the diminution in the amount of urine; while of course the risk of blood poisoning and fatal coma becomes proportionately considerable. Such cases are, however, the exception; recovery being the rule.

The earliest signs of improvement are a more natural appearance of the urine to the naked eye; a diminution of the albumen and renal epithelium; and an increase of all those urinary constituents which have been previously lessened,—the water and urea and chlorides especially. As such increase takes place, the dropsy quickly diminishes. It is not uncommon for a patient during convalescence from this disease, to pass from four to six pints of urine during the twenty-four hours; the natural quantity averaging only from two to two and a half or three pints.

The very unfavourable phenomena which follow a suppression of the functions of the kidneys have already been described. It may, however, be remarked, that when the blood becomes loaded with urea a strong urinous odour is often to be detected in the perspiration, and in the breath, as well as in the matters vomited. In one marked case of uræmic toxæmia, occurring after scarlet fever, which I saw in consultation with Mr. Kingsford, of Sunbury, a large linseed poultice applied over the loins gave out a sickening and very disgusting smell; the effluvium being so powerful that it pervaded a large house.

The curious circumstance that acute desquamative nephritis from scarlatina is more frequent after a mild than after a severe attack, is probably explained by the want of caution which is often observed in such cases during the period of desquamation. The patient gets exposed to cold, and immediately the escape of the fever-poison through the pores of the skin is checked; which poison, as a consequence, is directed to the kidneys in larger quantities than they can bear. The disorder usually commences somewhere about the twenty-second day from the setting-in of the fever.

Diagnosis.—The preceding observations leave nothing to be noticed under this head, except as to the presence of *albumen* and *casts* of the tubes in the urine. Now it must be remembered that the former substance, though very frequently, is not always the result of temporary or permanent disease in the secreting structure of the kidney. On the contrary, it may originate from a depraved or unduly watery condition of the blood; from some transient congestion of the renal capillaries, the consequence of cold, or of an eruptive fever, or of inflammation of some internal organ; from passive venous congestion consequent upon long-standing cardiac or hepatic disease; from lesions or reflex irritations of the nerve fibres that regulate the calibre of the renal bloodvessels, such as happen sometimes in hemiplegia and paraplegia; from diseases of the pelvis, of the kidney, or of the ureter, or of the bladder, or of the urethra; as well as from pressure upon the vena cava, or on the emulgent veins of the kidney, by an abdominal tumour, by a pregnant uterus (?), or by disease in the connective tissue surrounding the kidney. Nevertheless, when albuminuria is long persistent, we may be sure that it is associated with organic disease of the kidney. Under these circumstances a minute examination of the urine reveals the presence of casts,—moulds of the tubes taken in some coagulable material. As this matter is effused, it entangles in its structure the contents of the tube. Hence we have several kinds of casts,—the waxy or fibrinous, the fatty, the epithelial, the granular (consisting of disintegrated epithelium), the bloody, &c.

When analysing the urine for albumen, two tests must be employed—heat and nitric acid. On applying heat, 150° to 175° Fahr., to albuminous urine in a clean test-tube, the albumen coagulates and produces a cloud varying in density. This cloud commences at the surface, and can be seen to gradually extend through the fluid as the boiling point is gradually approached. Coagulation only takes place, however, when the urine is acid; for alkaline, or even neutral urine may be loaded with albumen, and yet heat will produce no deposit. In such a case the secretion must be rendered acid by the addition of nitric acid until the deposit is thrown down; heat being then applied to make sure that the precipitate remains unchanged. It does not answer merely to add a drop or two of acid and then to apply heat, for under these circumstances the urine may be loaded with albumen and yet no deposit be formed; a circumstance that Dr. Bence Jones has supposed to be due to the formation of a nitrate of albumen, which is soluble in a weak and even boiling solution of nitric acid, but is insoluble in a more acid mixture. This explanation has seemed unsatisfactory to Dr. Beale; who concludes from some experiments that a trace of nitric acid prevents the coagulation of a moderately strong solution of albumen by heat, in consequence of its decomposing the phosphates and setting free phosphoric acid in which albumen is soluble. When an excess of nitric acid is added its action overpowers that of the phosphoric acid, and albumen is precipitated. The nitric seems preferable to the acetic acid, which is sometimes recommended for acidulating neutral or alkaline urine; because an excess of the vegetable acid dissolves albumen during boiling. Moreover, heat alone must not be trusted to in any case, since it renders the urine cloudy when there is an excess of earthy phosphates; this cloud being dissolved by nitric acid, while the albuminous deposit continues permanent. Again, nitric acid alone may give rise to turbidity, owing to the decomposition of the urates held in solution, and the precipitation of amorphous uric acid; the latter being decomposed, and the urine rendered clear though of a brown tint, on using heat. It may be worth remembering also, that the use of copaiba, or of cubebs, sometimes produces in the urine a substance which is precipitated by nitric acid, and which thus looks like albumen.

In order to form a rough and ready estimate of the quantity of albumen passed in the urine, we may note the proportion of sediment to clear urine after boiling and settling in the test tube,—such as three-fourths, or one-half, or one-fourth, or one-eighth, and so forth. This is better than Dr. Christison's seven degrees of coagulability, and more exact than the plan I have long adopted of such a quaternary division as the following:—(1) Completely coagulable by heat,—the albumen occupying nearly the whole quantity of urine boiled. (2) Strongly coagulable,—half the quantity. (3) Moderately coagulable,—a fourth of the quantity. (4) Slightly coagulable,—only a hazy appearance, undistinguishable from a deposit of phosphates until after the addition of nitric acid.

Prognosis.—This may generally be favourable. The chief points to be feared are the occurrence of uræmic convulsions or coma, owing to suppression of the functions of the kidneys; or the setting up of acute inflammation in one of the serous membranes, or in the air tubes, or in the lungs: or of uncontrollable sickness or diarrhœa being induced. There is likewise some risk lest abundant effusion into the pleuræ or pericardium should prove fatal; as well as of apoplexy happening from effusion into the cerebral ventricles, or into the meshes of the pia mater. Another rare cause of death is the formation of a thrombus or clot in the pulmonary artery. Assuming that these dangers are avoided or got over, there must still be felt some anxiety lest permanent structural disease of the gland should set in. Care ought to be taken not to discontinue treatment until the urine is found by chemical and microscopical examination to be quite healthy, which may require six months or more.

Treatment.—In seeking to cure acute inflammation of the kidney, we have to remember—as Dr. George Johnson remarks—"that there has been, first, a morbid condition of the blood, which has excited disease in the kidney; and that, as a secondary consequence of the renal disease, the blood has become contaminated by the retention in it of urea and other excrementitious matters."* Our double object must therefore be to rest the affected glands, while we purify the blood by means of the other excretory organs. To carry this plan into practice, the patient ought to rest in bed, in a moderately warm room, and be placed on milk diet; at the same time allowing him an abundance of simple drink—water, tea, or barley water. In order to get the skin and bowels to act freely, the hot air or hot-water bath (F. 119, 130) must be used once daily for three or four times; while diaphoretic medicines

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* *On Diseases of the Kidney*, p. 126. London, 1852.

(F. 209, 211, 217) are to be administered, together with saline or other purgatives (F. 141, 151, 160, or 169). In many instances, elaterium (F. 157), given so as to produce free purging, is very beneficial; but for children I usually prefer the compound jalap powder, in doses varying from fifteen to forty grains. Dry cupping over the loins often seems to be useful; or a few leeches may be applied, using hot fomentations or large linseed poultices for many hours subsequently. Powerful diuretics should never be had recourse to in this disease; since in the early stages they do great mischief, while in the latter they are unnecessary. Supposing a drug of this class to be needed, however, not one can compare with digitalis; inasmuch as it acts well without irritating the kidney. Astringents have been employed in this stage, such as tannic and gallic acids, and apparently with success. Where symptoms of uræmic toxæmia set in, the remedies already mentioned in treating of uræmia are to be resorted to.

Directly the feverish phenomena have subsided, attempts ought to be made to improve the quality of the blood, as well as to diminish the escape of the albumen, by the administration of steel; no preparation answering this double purpose better than the tincture of perchloride of iron (F. 392). At the same time, the patient can be permitted to leave his bedroom, though he is to be confined to the house. He may have tender animal food, with plenty of milk and one or two raw eggs daily. Spirits and beer had better be avoided; while wine, freely diluted, ought only to be allowed if it seem really required. Under this treatment the dropsy will completely subside, while the albumen and tube-casts gradually diminish until none can be detected in the urine. It is always advisable to examine the latter, both chemically and microscopically, every few weeks for some time after a cure appears to have been effected. Moreover, the patient will have to clothe warmly, wearing flannel next the skin; while he must long avoid exposure to cold and damp.

III. CHRONIC BRIGHT'S DISEASE.

Chronic Bright's disease, or chronic albuminuria, is a generic term for three very different renal affections which are accompanied by one prominent symptom—the presence of albumen in the urine. There is likewise a tendency to dropsy, with various secondary tissue degenerations. The diseases of this class are,—(1) The granular kidney; (2) The fatty kidney; and (3) the lardaceous kidney.

1. GRANULAR KIDNEY.

This disease has several synonyms,—the contracted granular kidney, the gouty kidney, the cirrhotic kidney, and chronic desquamative nephritis. Under the latter name it was first minutely described by Dr. George Johnson;* and to his researches we are consequently greatly indebted.

The granular or cirrhotic kidney is most frequently met with in the male sex; it is very rare before the age of thirty; it is sometimes associated with cirrhosis of the liver, and perhaps with thickening of the capsule of the spleen; and it is a morbid condition which comes on very gradually. It is frequently a consequence of chronic gout (Dr. Todd used to speak of it as the *gouty kidney*) or of some allied disorder of the general health; it will perhaps be the product of a long continued course of dissipation, with abuse of intoxicating drinks; while it may happen as a result of chronic congestion of the venous system, such as is met with in cardiac valvular disease. In some instances it comes on so insidiously that unless the urine be examined it may escape detection, until perhaps the patient is seized with a fatal attack of uræmia.

The disease, according to Dr. Johnson, is characterized by a long-continued shedding of the renal epithelium, which appears in the urine in a more or less disintegrated state. The tubes gradually lose their epithelial lining, and subsequently are atrophied or filled with a new material; while the connective tissue of the gland becomes hypertrophied, and all the other structures waste. The renal bloodvessels undergo changes; the coats of the smaller arteries especially getting thickened, while the capillaries become contracted and many of them impervious. The entire kidney becomes small and wasted and indurated: the Malpighian bodies seem to atrophy. Cysts are often seen in the cortical substance. According to Dr. Dickinson the disease does not affect the tubes primarily, but the intertubular connective tissue. There is proliferation of its elements, and production of fibres, beginning at the surface and advancing inwards, and it is by the contraction of the fibres that the vessels and tubes are strangulated and obliterated.

After death the kidneys are found contracted—possibly to less than half their natural size, according to the length of time the disease has existed. Their surfaces are uneven and perhaps puckered, their fibrous capsules are thickened and morbidly adherent so that they cannot be cleanly peeled off, while their cortical portions especially are shrivelled.

The urine is, for the most part, slightly albuminous; while it is pale, greater in quantity and of a less density than in health, varying from 1005 to 1015. If we examine it microscopically, we shall find particles of degenerated epithelium, abundant scattered amorphous granular matters and cylinders, which have evidently come from the renal tubes, and which are known as *granular epithelial casts*.

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* *Opus jam citat.*, p. 168. Also, *Medico-Chirurgical Transactions*, vol. xxx. p. 165. London, 1847.

This affection produces great changes in the blood, and many and various constitutional disorders consequent upon these changes; amongst which the most frequent are hypertrophy of the heart—with or without disease of the valves—inflammation of the serous membranes, dropsy of one or more serous cavities, anasarca, and lastly, either structural changes, or great functional disturbances of the nervous centres.

To speak rather more in detail, granular kidney will possibly exist for some time without producing any marked *symptoms;* or the renal disease may be masked by the progress of some pre-existent and causative malady. Thus, I have seen instances of chronic gout where the disease of the kidney has become far advanced without having manifested itself by any special signs; and hence in all such cases the urine should be frequently tested. On the other hand, many examples of this form of nephritis are attended with failing health and strength; the skin is harsh, dry, and sallow; the appetite is variable, sometimes bad, at other times voracious; there may be dyspepsia, mental depression, rheumatic pains, or some pulmonary derangement; and in several instances there have been frequent attacks of bleeding from the nose, and even of gastric or cerebral hæmorrhage. Impairment of vision is common in this, as in other varieties of chronic kidney disease; the changes in the vessels and nerve tissues of the retina sometimes progressing to such an extent as to cause total blindness. By the use of the ophthalmoscope in nephritic retinitis, effusions of serum or of blood have been found in the retina, especially in the neighbourhood of the disc; and a peculiar form of degeneration of the retinal elements is seen giving rise to numerous white spots around the optic disc and the macula lutea.

As the renal mischief progresses, the patient loses flesh; but such a loss may occasionally be concealed by the anasarcous swelling of the body, though dropsy is by no means a constant feature of this affection. Indeed, many cases prove fatal without the occurrence of dropsy in any form; while in others there will perhaps be merely a puffiness about the face and eyelids, with slight swelling of the ankles. Dyspepsia is almost always present. Sickness is sometimes troublesome, but diarrhœa is uncommon. The urine is larger in quantity, and is passed more frequently than in health; and especially has the patient to rise once or oftener in the night to empty the bladder. On testing this fluid it may be found of normal colour, reaction, specific gravity, and free from any blood; while where the disease is in an early stage there need not necessarily be any albumen. As a rule, however, the urine is pale and has a low specific gravity, even before albumen appears in the urine, and perhaps before disease is actually present in the kidney. But in all instances, if the secretion be allowed to stand, and the sediment be minutely examined, the microscopist will detect a granular material in small masses, and coarse opaque cylinders, which consist of disintegrated epithelium from the basement membrane of the tubes, washed out with urine. As the disorder advances the epithelium becomes shed more abundantly, and the urine gets decidedly albuminous, though rarely to any considerable degree.

This affection often makes but slow progress, especially at first. Where it happens as a secondary disorder, the cure or retardation of the latter will have a very beneficial influence in mitigating the kidney complaint. But when it gradually advances, the patient becomes thin and anæmic, and complications arise. From the resistance to the circulation of the blood contaminated by the results of imperfect elimination, additional work is thrown upon the heart, which becomes hypertrophied in consequence; the minute arterioles are also thickened, and exhibit hypertrophy of their muscular coats, as was first shown by Dr. Johnson. By the increased propulsive power of the heart and the increased resistance in the capillaries and arterioles, an extreme degree of tension is produced in the entire arterial system, which leads to disease both in the heart and arteries from strain, and to cerebral and other hæmorrhage. Pneumonia, or pleurisy, or pericarditis may come on, or uræmia may set in. Of course the *prognosis* must be partly regulated by the mode of living which the patient adopts, and the steadiness with which he will follow the rules prescribed for him.

With regard to the formation of *cysts* in the structure of the kidney there is much still to be learnt. Probably they are produced in several ways. The principal are,—obstruction of tubes, from too rapid or abundant desquamation of the secreting cells, with dilatation of the portions above the plug; dilatation of tubes which have permanently lost their epithelial lining into cysts, in consequence of the basement membrane continuing to be nourished and to secrete serum into their channels; and lastly, the wasting and disintegration of circumscribed patches of renal tissue causing small cavities. When the tubes get obliterated near the Malpighian bodies, the vessels will probably waste, while the flask-like terminations of the tubes become expanded and transformed into cysts. In whatever manner produced, these simple cysts are found to be few and scattered, or very abundant; while they can either be of considerable size, or so minute as to be invisible to the naked eye. In adults it is far from uncommon to find numerous small cysts, which are filled with limpid, colourless serum. Now and then the whole of the gland appears to be converted into a congeries of these sacs. This has been found to be the case in the new-born infant. Thus, in April, 1857, Mr. J. Jardine Murray delivered a half-witted girl of a monstrous child in the Royal Maternity Hospital of Edinburgh. The labour was tedious, considerable force being required to extract the greatly enlarged abdomen of the child after the head and arms had been expelled. The cause of this enormous size proved, on dissection, to be a cystic disease of the kidneys. Both kidneys were equally affected. The right weighed very nearly 14 oz. Its vessels and ureter were normal in size and appearance: the external surface was smooth. On making a section of the organ, the whole substance seemed to consist of pearly cysts containing serous fluid; their average size being that of a pea.*

The *treatment* of granular kidney, for the most part, resolves itself into the adoption of means for the removal of that morbid state of the blood and constitution generally, of which the renal affection is only a result and a manifestation. When the disease is the consequence of gout, we must regulate the diet—disallowing sugar and all fermented liquors; attention should be paid to the various excretory functions; while such remedies ought to be employed as are indicated by the patient's general mode of life and state of health. Great benefit will always be derived from keeping the skin warm, and from the occasional use of the warm water, hot air or vapour bath: diaphoretic medicines (F. 209, 211) are also useful. Gentle aperients; dry cupping over the loins frequently repeated, or counter-irritation to the same part by sinapisms, ointment of tartarated antimony, or ammonia liniments; quinine, iron, and other tonics—these are all remedies which often afford considerable relief. Mercurials, and all diuretic medicines, except digitalis, are strictly to be avoided. Opium is not to be given in any form without great caution. Even small doses may cause fatal suppression of urine.

In cases attended with *dropsy*, we may every now and then use those purgatives which produce copious watery stools, such as elaterium, gamboge, jalap, scammony, &c. (F. 151, 157, 158, or 168). These are, however, not often required, since decided dropsy is not common. Only exceptionally is there spontaneous diarrhœa; but if this should set in, it is not to be checked, unless it be producing exhaustion. Where there is much depression, as there usually is after a time, we must avoid drastic purgatives, and simply get the skin to act freely by the exhibition of some diaphoretic draught at bedtime; or especially by the use of the hot air bath, repeated every night, or on alternate nights. The mineral acids with bark (F. 376), or salicin (F. 388), or steel and pepsine (F. 394), may temporarily impart a sense of renovation; while cod liver oil (F. 389), will often prove beneficial. The diet should be generous; with milk and eggs and vegetables, white fish, and mutton or poultry or game if such can be digested. A moderate quantity of wine can perhaps be allowed without detriment if the patient have been much accustomed to alcoholic drinks; but in a large number of cases I am sure it is better to dispense with all stimulants. Flannel drawers and waistcoats ought to be worn all the year round. Change of air, particularly a sea-voyage, often proves very valuable.

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* *The British and Foreign Medico-Chirurgical Review*, vol. xxvi. p. 509. London, October, 1860.

2. FATTY KIDNEY.

The epithelial cells of the kidney in health contain a small proportion of fat. Under the conditions now to be described, this proportion becomes abnormally increased.

There are two forms of fatty kidney; the gland being enlarged in one variety, and contracted in the other. The *enlarged pale and mottled kidney* is a result of subacute inflammatory action and fatty degeneration. In a typical example of this condition, the uriniferous tubes may be almost choked with oil-globules; the walls of the capillaries being also affected. This form of disease has been thought by several pathologists to be an early stage of the *fatty contracting kidney,* but it is most likely that the two conditions are distinct. Although it cannot be positively affirmed that the mottled kidney never undergoes atrophy, yet (as was remarked by Mr. Simon in 1847) in an infinitely large proportion of cases such a gland remains large and mottled to the end. According to Dr. Dickinson the importance to be attached to a fatty condition of the renal epithelium has been much exaggerated: the epithelium though fatty for a time, may recover its natural characters. Certainly it has been known for several years, that in the domestic cat, as found in London, the tubes of the kidney are almost invariably loaded with oil. That this state is an abnormal one seems probable. Yet it does not seem to interfere with the action of the kidneys, or with the health of the animal.

Renal fatty degeneration is often seen in connexion with some exhausting disease, such as tubercle or cancer. It also sometimes occurs during the wasting of old age. Fatty infiltration of the kidney—a state of fatty accumulation—may result from the excessive consumption of food rich in oily matter.

A fatty contracting kidney is a very serious form of disease; and one which is as sure to cause death as any other grave structural affection of a vital organ. The gland loses bulk and weight. The cells of the uriniferous tubes get loaded with oil globules; while the latter, with degenerated cells, are also found free in the tubes, perhaps to such an extent as at parts to choke up the channels. The size of the tubes undergoes changes,—increased in one part, diminished in another. The coats of the small arteries become thickened and degenerated, as happens in most instances of chronic renal disease; while here and there the canals of these vessels are perhaps obstructed by small masses of fibrin—emboli, which have been carried in the circulation from the lining membrane of the heart or large vessels.

Fatty degeneration of the kidney may be the consequence of acute desquamative nephritis. According to some authorities it is really the second stage of this tubular inflammation. Fatty transformation, however, undoubtedly happens where no evidence of pre-existent inflammation can be traced. Sometimes it occurs in connexion with fatty degeneration of the muscular fibres of the heart. It has been found frequently with fatty liver; and now and then after death from diabetes. Cases are not rare of its association with scrofula: or with the development of tubercular disease in the membranes of the brain, or in the lungs, or in the glands of the mesentery, &c. It also occasionally arises from the effects of one of the eruptive fevers, or from bad living, constant exposure to wet and cold, intemperance, &c. Hence the renal textural changes are but the expression of that which no doubt primarily is a blood disease.

The appearances in the urine characteristic of this disorder are the following:—A scanty secretion, which is highly albuminous and of low specific gravity. It is generally, in the early stages, free from sediment; and, when examined by the microscope, is found to contain neither renal epithelium, nor casts of tubes—or if any, only small waxy (hyaline) casts. After an interval which is variable in different cases, while the general characters of the urine remain unaltered, there appears a light and cloudy sediment. In this deposit there are usually discovered numerous granular casts, with perhaps some of the small waxy casts; while in these moulds are entangled globular or oval cells enclosing a considerable number of oil globules, several of the cells being completely filled with oil, and presenting the appearance of dark opaque masses. Usually, several of the casts have adhering to their surface many small oil globules, which have probably escaped from ruptured cells: while numerous cells containing oil, together with detached fat globules, are scattered over the field of the microscope.

Where the urine is of a natural colour, highly albuminous, of a low specific gravity, and presenting a large number of oily casts and cells, the *prognosis* is most unfavourable. Dr. George Johnson says that these appearances indicate as serious and intractable a malady as tubercular disease of the lung. He has examined the urine in a considerable number of these cases, and in no one instance did he find that this secretion regained its normal condition, or ceased to be albuminous. The patient's life may be prolonged by careful management, but he cannot hope to be cured.

The odour imparted to healthy urine by the digestion of asparagus must have been noticed by every one; while most practitioners are doubtless familiar with the smell of violets which the renal secretion gives off in patients who are taking turpentine, as well as with that of pepper when attempts are being made to check a gonorrhœa by cubebs. It has been stated by De Beauvais, that in albuminuria these effects are not produced; and from experiments which have been performed it would seem that, with a few exceptions, the observation is correct.

The chief *symptoms* produced by this disease are—gradually increasing debility; feeble action of the heart, with a frequent and irritable pulse; a striking pallor of the face, as well as of the skin generally, perhaps combined with puffiness of the former; a disposition to frequent micturition, the patient having to rise once or oftener in the night to pass water; and dyspepsia, with attacks of obstinate vomiting. Troublesome headaches are sometimes complained of, with dimness of sight and fits of vertigo. There is always a tendency to grave inflammations of the serous membranes—such as pericarditis, peritonitis, meningitis, and pleurisy; and occasionally to amaurosis, sometimes attacking both eyes, and perhaps due to fatty degeneration of the retina. Then we have anasarca of the limbs, with dropsy of the different cavities, much more frequently than in contracted granular kidney; in rare cases (unless there be coexistent heart disease, when such a result is more common) œdema of the lungs setting in suddenly, and rapidly producing serious dyspnœa; severe sickness and head symptoms and perhaps epileptic convulsions, probably due to the effects of the retained urea upon the nervous system; and ultimately coma, which soon ends in death.

Occasionally cases are met with where almost all these symptoms are wanting. A moderately healthy looking individual has to rise two or three times in the night to micturate; he suffers from attacks of headache; and he perhaps complains of languor. There is neither great anæmia, nor loss of flesh, nor any dropsy. Perhaps he does not think it necessary to have medical advice; so that the albuminous state of his urine, which is sure to be present, is not detected. Yet suddenly, while in what the friends regard as his usual state of health, he has a severe fit of convulsions; from which he seldom if ever recovers. In fact, consciousness is not restored, and he dies in from eighteen to thirty-six hours.

In the *treatment* of the ordinary cases of fatty kidney, we can do little more than palliate the symptoms, and so hope to prolong life. The diet should be regulated; and abstinence from every kind of intoxicating drink, from starch and sugar, and perhaps from fatty articles of food, insisted upon. As a rule, there is considerable risk in administering any preparation of opium, where the urea is imperfectly eliminated from the blood; although in hopeless cases, when we find great irritability and restlessness, an opiate may be prescribed on the principle of choosing the least of two evils. Where the anasarca of the lower extremities is considerable, punctures should be made with a sharp-pointed lancet on the outside of the legs; afterwards wrapping the limbs completely in chamois leather. In other respects, the rules laid down in the preceding section must be attended to.

3. LARDACEOUS KIDNEY.

This disease comes on insidiously, and runs a sluggish course. It is most frequently met with between the ages of twenty-one and fifty, though not peculiar to any period of life; and it attacks both sexes nearly equally. At the end of a variable number of years, it proves fatal; the time being in a great measure dependent upon the presence or absence of any scrofulous caries, or of the tubercular or syphilitic cachexia, or of persistent suppuration.

To say much upon the general nature of this disorder would only be to repeat in a wearisome manner the remarks which have already been made. Suffice it therefore to notice that waxy, lardaceous, or amyloid degeneration of the kidney probably never exists alone. It is a constitutional affection; in which several other organs, but particularly the liver and spleen, are almost simultaneously and similarly attacked. These glands become infiltrated with a translucent waxy material. The infiltration or degeneration begins in the kidneys in the capillary tufts of the Malpighian bodies, and in the coats of the small arteries; the tubes subsequently being affected, and getting filled with a transparent material. The effect on the kidney is at first to render it slightly firmer and paler than natural; then to increase it in bulk and weight, in pallor and density; and lastly to lessen the weight, and contract the gland. The latter also becomes more and more inefficient as an excreting organ and ultimately useless. The disease causes the urine to be albuminous, while there may sometimes be found waxy or hyaline casts of the tubes, but little or no renal epithelium. And then the victims of it present all those marked symptoms which are usually set down as due to Bright's disease, among which dropsy is prominent.

The lardaceous kidney is met with in connexion with tubercular phthisis, advanced constitutional syphilis, and prolonged suppuration—often such as is due to scrofulous caries of the bones. I have also twice observed it in consequence of the suppuration of ovarian tumours. In one, the ovarian cyst opened spontaneously through the abdominal wall, discharged a large quantity of putrid pus, and for quite six months continued to throw off small quantities of thin purulent matter. In the second case, the tumour was tapped by a distinguished surgeon, the cyst-wall seemed to inflame and suppurate, and for months a flow of pus continued daily through the wound left by the trocar and cannula. In both cases, the urine became highly albuminous; while it contained waxy casts. Prior to the morbid action in the ovarian tumours, the urine was healthy.

Professor Virchow states that a large proportion of the cases of Bright's disease, and especially of the chronic ones, are assignable to this change. The changes which the kidney undergoes cannot be distinguished immediately with the naked eye; so that not until iodine has been employed, can it be said what the disease really is. If a solution of iodine (the officinal liquor iodi answers well) be applied to the anæmic cortical substance, a number of brownish-red points appear, corresponding to the Malpighian bodies, with sometimes fine streaks also which are the afferent arteries; and next to this, when the disease is very severe, red parallel lines are also seen within the medullary cones, lying very close to one another. These are all arteries.

Two excellent essays on this disease, illustrated by the reports of thirty-four cases, have been published by Dr. T. Grainger Stewart of Edinburgh.* From these examples, the *symptoms* appear to run the following course:—An individual who has had scrofula, prolonged suppuration from disease of the bones, or syphilis, or perhaps who is merely of a weak constitution naturally, finds that he is losing strength, that he suffers from thirst, and that he passes large quantities of urine. He has to rise in the night to micturate; and altogether three or four times the natural amount (fl. oz. 50) of urine may be excreted in the twenty-four hours. At the end of the day, the feet and ankles are observed to be more or less swollen; but a night's rest removes the œdema. As the lassitude increases, a swelling and hardness about the hepatic and splenic regions can be detected, owing to enlargement of the liver and spleen. On examining the urine it is found albuminous, of a low specific gravity, pale in colour, and of an acid reaction; while on placing a portion of the scanty sediment which it contains under a quarter of an inch object-glass a few delicate, transparent, waxy or hyaline tube-casts are seen. These casts are formed by the coagulation of an exudation from the blood-vessels into tubules denuded of epithelium: if the affected tubules contain a few cells, epithelial elements will be observed enclosed within the casts. This state of affairs may continue for months, or under favourable circumstances for a few years. But sooner or later, very distinct evidence of anæmia is observable; the amount of albumen increases considerably, while the quantity of urine diminishes; attacks of diarrhœa increase the debility, where the intestinal mucous membrane becomes affected with waxy degeneration; and ascites or general dropsy sets in. Ultimately the patient sinks, either from persistent diarrhœa, from effusion into the serous cavities, from bronchitis or pneumonia, from pulmonary consumption, from exhaustion, or from convulsions and coma due to uræmic poisoning.

Concerning the nature of the new material which is deposited or formed in the walls of the small arteries and in the surrounding tissues, we have no very precise information. According to Dr. Dickinson it consists of fibrin, which has been thus deposited in consequence of the loss of the free alkali which is naturally associated with it. The dealkalized fibrin has its origin in protracted suppuration; the discharges removing the alkalies from the system, and at the same time causing a relative increase in the amount of fibrin.*—Dr. Grainger Stewart believes that as to the real nature of the disease we must confess ignorance, and he doubts the correctness of some of Dr. Dickinson's views. The points which seem to Dr. Stewart well-established are,—(1) That it is a true degeneration or transformation of tissue, and not an infiltration. (2) That it consists of an albuminous material, probably deficient in alkali. And (3) that it results from long-continued exhausting diseases; such as syphilis, tuberculosis, caries, and chronic suppuration.†—In partial confirmation of the foregoing, it may be added that several chemists, particularly Kekulé and Kühne, have expressed an opinion that the material is closely allied to albumen; and that since it has no relation to cellulose or starch, it cannot with propriety be termed amyloid.

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* "On the Waxy, or Amyloid Form of Bright's Disease." *Edinburgh Medical Journal*, February, 1861, and August, 1864. See also *Practical Treatise on Bright's Diseases of the Kidneys*. Second Edition. Edinburgh and London. 1871.

As regards the *treatment*, much good may be effected in the early stages by a nourishing diet, by residence at the seaside, and by the persevering employment of ferruginous tonics. Where there is any evidence of the previous existence of syphilis, iodide of potassium and some bitter infusion (F. 31), or iodide of iron (F. 32, 390), will often prove of great service. Occasionally, in these syphilitic cases, I have seen benefit result from the employment of the mercurial vapour bath (F. 131); but the effect of this remedy ought to be watched. Certainly, in no other form of albuminuria is mercury in any shape to be prescribed.

IV. DIURESIS.

The term Diuresis [Διὰ = through + οὐρέω = to pass urine] is applied to that condition in which an excessive quantity of pale limpid urine is daily excreted. It is often spoken of as Diabetes Insipidus; the only objection to which is that it might lead to its being confused with saccharine diabetes, while there is not the least connexion between the two affections. For although it was at one time believed that the urine in cases of chronic diuresis contained a tasteless kind of sugar, yet this view has now been completely disproved; and it is allowed on all hands that no saccharine matter of any kind is ever present.

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* *On the Pathology and Treatment of Albuminuria*, p. 174. London, 1868.

† *A Practical Treatise on Bright's Diseases of the Kidneys*, p. 184. Edinburgh and London, 1868.

The two chief *symptoms* in this affection are,—insatiable thirst (polydipsia), and the elimination of an excessive quantity of urine. Generally speaking, the watery constituent of the latter is alone increased, the total amount of urinary solids not being greater than in health. This was the case in a delicate young lady, suffering from uterine disease, seen by me in consultation with Dr. George May of Reading; in which instance eight quarts of pale urine were passed in the course of the twenty-four hours, sometimes for many days in succession. At the same time, a very few examples are recorded, where the urea and chloride of sodium have both been found considerably above the normal standard.

The amount of urine which comes away is sometimes so great, that it has been believed to be in excess of the fluid consumed. Patients, especially young females, will produce tables very clearly kept, showing that when the whole quantity of fluids drunk in the day has been two pints, the urinary secretion has amounted to as many quarts or even to much more. From a glance at a little note-book now before me I find Miss A. B. recording that on the 14th January the whole quantity of nourishment taken consisted of one pint and a half of fluids, half a pint of jelly, five small oranges, seven slices of toast or bread and butter, and one bun: while the urine discharged was seven quarts. On the following day, the consumption of fluids and solids was slightly lessened, and the urine fell to six quarts. And in this way the report goes on for many weeks, six and seven quarts of urine resulting from a pint and a half of cocoa or coffee. Discussion with patients thus infatuated answers no good purpose. It is much better quietly to suggest that the tables are by no means extraordinary; at the same time insisting that further observations of the kind are quite unnecessary, and must not be made. Nevertheless, it is really a question whether there may not be some excess of the urine over the liquid taken, under certain circumstances. If there be, one of three explanations—as Dr. Parkes points out—must be adopted:—(1) Either the body becomes poorer in water, and so loses weight. (2) Or, water is absorbed by the skin and lungs. (3) Or, water is formed in the system by the direct union of its elements—oxygen and hydrogen.—No reference is here made to the absorption of dropsical effusions, because the removal of these fluids in this manner has no bearing on the argument in question.

In the *treatment* of those cases where there is only an excess of the urinary water we cannot do better than employ one of the astringent preparations of steel. The tincture of the perchloride of iron with hydrochloric acid (F. 101), or the ammonia iron-alum (F. 116), will generally answer every purpose. Sometimes a dose of opium at night may do good; or if the action of the skin be suppressed a few warm baths can be ordered. Trousseau gave large doses of valerian with good results, and should the iron fail to do good, 10 or 15 grains of powdered valerian may be given, first three times a day, then four, five, or six times, till an impression is made. Supposing that the urinary solids are increased, indicating undue waste of tissue, the cause must be sought before the effect can be removed. Especially ought the symptoms of nervous exhaustion to be looked for; while if such are present, cod liver oil, phosphoric acid and nux vomica (F. 376), and a diet of animal food with a little good beer, will probably prove useful. In all cases the amount of fluids consumed must be regulated.

A remarkable form of *infantile diuresis*, which has been well described by Dr. Prout* as not uncommonly happening soon after weaning, ought to claim attention. The symptoms are as follows:—From having been healthy until the change of food, the child begins to get dull and inactive, and to daily lose flesh. The skin feels harsh, dry, and hot. The bowels become irregular; the motions assuming an unnatural greenish appearance. The abdomen grows prominent, so as to lead to the suspicion of mesenteric disease. At this period, the urine is generally scanty and high coloured; becoming turbid immediately on cooling, and letting fall a pale and clay-coloured deposit of urates, sometimes intermixed with the oxalate of lime. Now and then there is an excess of phosphates. As the disease proceeds, the quantity of urine rapidly increases; and the thirst being commensurate, large quantities of fluid are consequently taken. Under these circumstances an infant about twelve months old will be often found to pass from two to four or five pints of urine in the twenty-four hours. The urine in this, and indeed in all the subsequent stages of the affection, is commonly transparent, and of a pale yellow or greenish tint. Its specific gravity varies from 1010 to 1025; while on examination it will be found to contain a great excess of urea, and occasionally even traces of albumen or sugar.

This form of diuresis must be considered as rather formidable; since, if it be neglected or maltreated, it most commonly ends in organic lesions of the kidneys, or in diabetes. It most frequently occurs in the children of strumous individuals, who are at the same time dyspeptic or gouty; especially if such children have been improperly nourished, or have been brought up in confined and imperfectly-ventilated apartments.

The general principles of treatment are,—removal to a pure country atmosphere, or to the seaside, where a bracing dry air can be breathed; the employment of tepid, or warm, sea water baths; as well as attention to the diet—animal food (minced very fine or pounded in a mortar) and farinaceous matters being most suitable, with plenty of milk. As soon as possible, there should be a gradual but steady diminution in the quantity of fluids allowed. Now and then, the administration of small doses of Dover's powder to increase the functions of the skin, as well as to relieve the general irritability, seems advisable. Gentle aperients will be needed to regulate the state of the bowels; pepsine should be tried, if any indications of dyspepsia present themselves; cod liver oil serves to remove all evidence of imperfect nutrition; and lastly, tonics of bark, quinine, or steel, will prove highly useful.

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* *On the Nature and Treatment of Stomach and Renal Diseases.* Fifth Edition, p. 58. London, 1848.

V. HÆMATURIA.

Hæmaturia [from Αἶμα = blood + οὖρον = urine] or hæmorrhage from the mucous membrane of the urinary passages, may proceed from the kidneys or bladder or urethra. It is common in the early stages of those forms of renal disease which have their origin in a morbid state of the blood: hence, as we have already seen, it is a frequent result of acute desquamative nephritis. It may also arise from malignant or tubercular disease of the kidney or bladder, or from a villous tumour here; from the presence of a calculus either in the kidney, ureter, bladder, or urethra; from cystitis; or from renal inflammation, as well as from granular degeneration. A blow over the loins has caused it; while irritating medicines, such as oil of turpentine and cantharides, can also produce it. Occasionally it sets in during the course of rheumatic fever, pneumonia, continued fever, malignant small-pox, scurvy, &c., just as epistaxis does. Having more than once seen urine contaminated with the menstrual discharge mistaken for real hæmaturia, it will hardly be deemed superfluous to give a word of caution. As a rule therefore, in any case of suspected renal disease occurring in women, the practitioner should not venture on stating a positive opinion while the patient has her courses on.

Urine containing blood in comparatively small quantity will be found of a peculiar smoky hue, or even of a black colour (owing to the action of the acid of the urine on the hæmatin), and loaded with albumen. If the escape of blood be free, the colour may vary from a port-wine hue to a bright arterial tint. The *distinction between renal and vesical hæmorrhage* is important. Dr. Prout states that when the "blood is derived from the *kidney*, it is in general equally diffused throughout the whole urine; on the contrary, when derived from the *bladder*, the blood for the most part comes away in greater or less quantity at the termination of the discharge, the urine having previously flowed off nearly pure." Sir Thomas

Watson has also remarked that the expulsion of slender, cylindrical pieces of fibrin, which have evidently been moulded in the ureter, is characteristic of hæmorrhage from the kidney or commencement of the ureter. Moreover, in hæmorrhage from the secreting portion of the kidney (not the pelvis), the urine on being examined microscopically is usually found to contain casts of the renal tubes formed of coagulated blood (often spoken of as *blood-casts*) ; while there is also seen the delicate round renal epithelium, with casts composed of epithelial cells and blood corpuscles. When the bleeding is from the bladder, the blood corpuscles are observed mixed with the flat scaly vesical epithelium ; and the urine may contain more or less muco-purulent matter. Supposing malignant disease to be the cause, cancer cells will not unfrequently be found in the urine, and so determine the diagnosis. If there be one or more calculi, the hæmorrhage will be lessened or entirely checked by rest, and increased or reproduced by any jolting exercise. While where the blood comes away in drops or in a stream, unmixed with urine, the urethra is in all probability its source.

During the last year or two, the histories of numerous cases of *intermittent* or *paroxysmal* hæmaturia have been recorded in the medical journals. Though of rare occurrence, this disorder did not escape the observation of Rayer, of Elliotson, &c. The pathology of it is involved in doubt. The precise cause of it is unknown. Sometimes this affection is apparently connected with marsh miasma, the blood appearing at regular intervals, and perhaps being accompanied by imperfect rigors. This form can often be cured by full doses of quinine or arsenic. In other instances, it seems to have had its origin in simple exposure to cold ; and in these the usual remedies for malarial poisoning are valueless. The urine is quite healthy, except at the time of the attack. Then it is found of a deep brownish-red colour ; it contains an excess of urates and mucus ; a variable (as regards quantity) precipitate of albumen is thrown down by heat or nitric acid ; while no blood corpuscles can be seen on a microscopic examination, but only disorganized blood constituents and possibly tube-casts of disintegrated blood ; crystals of oxalate of lime are often present. The blood elements come from the kidneys ; and possibly as an exudation from the Malpighian bodies. The absence of blood corpuscles looks like an indication that there has not been a rupture of any vessel.

A peculiar form of hæmaturia is sometimes met with in Egypt, Southern Africa, and the Mauritius, which is probably due to the Distoma hæmatobium. The eggs of this parasite are to be found in the urine, and sometimes the perfect entozoon may be discovered. The parasite is probably introduced into the system by drinking the waters of the district without filtering them.

The *treatment* will vary with the circumstances under which the hæmorrhage occurs. Where there is malignant disease, or a calculus at any part of the urinary tract, astringents should be resorted to; the best being the tincture of the perchloride of iron, gallic acid, Ruspini's styptic, the diluted sulphuric acid, &c. The fear of causing strangury must prevent the use of turpentine. Where there is some morbid poison in the blood, or actual renal disease, we ought to rest the kidneys, and promote elimination by the skin and bowels; for which purpose hot air or vapour baths, warm water baths, and purgatives, will prove the most effectual. Simple drinks, especially plain water, should be taken very copiously. Hæmorrhage from the urethra will often be checked by the application of ice; or by passing a large bougie, and leaving it in the passage for some hours. Lastly, in vesical hæmorrhage, a solution of alum or of tannic acid, of such a strength as to have a styptic taste, may be injected into the bladder; while the iron-alum can often be advantageously administered at the same time.

VI. CHYLOUS URINE.

Urine of a milky appearance from the presence of fatty matter, in a molecular state, is known as chylous urine—chyluria. In addition to the fatty matter there is generally present one or more of the following ingredients,—blood corpuscles, fibrin, albumen, and an imperfect albumen like that of chyle (albuminose?). The urine after standing for a short time, and unfortunately sometimes whilst it is in the bladder, coagulates into a trembling mass resembling blancmange or common size.

The importance to be attached to the fact of the urine being chylous varies in different cases, and there can be no doubt that the cause and pathological conditions are diverse. The most favourable instances are those where at some time in the twenty-four hours the secretion is healthy, containing neither chyle nor albumen. In one of the examples of this disease, which has fallen under my notice, the urine passed in the morning before taking food has more often than otherwise been healthy; the chylous condition setting in with the digestion of the breakfast. Here it is probable that the appearance of chyle was due to the imperfect assimilation of the nitrogenized constituent of the food, a portion entering the blood in the form of peptones, and retaining the property of diffusibility. But in the instance of a lady under the care of Mr. Cubitt of Stroud (Beale's *Archives of Medicine*, vol. i. p. 11. London, 1857), the urine passed in the morning, after a night's rest, was milky; while at no time was it ever so during the day. Mr. Dutt has also recorded (*Lancet*, 26th July, 1862) a similar instance; the patient, a male Hindoo, passing urine free from chyle during the day, while that voided during the night and in the morning was deeply loaded with it. A microscopic examination of chylous urine shows that the fatty matter is present in a molecular state; but if, in addition, cells of renal epithelium loaded with oil globules are found, such will indicate the co-existence of chronic Bright's disease.

On examining the kidneys after death in cases where the urine has been chylous, no alteration perceptible to the naked eye has yet been discovered. Nevertheless, the disease may possibly depend upon some structural change in these glands; owing to which certain constituents of the blood filter through the vessels into the urine. Dr. Carter of Bombay has detailed (*Medico-Chirurgical Transactions*, vol. xlv. p. 189. London, 1862) the particulars of three instances which have led him to believe that this affection is the consequence of a direct admixture of chyle and urine—a leak from the lacteal tract into the urinary. With regard to these three cases it seems highly probable that the explanation is correct. Recently an important addition has been made to our knowledge by the discovery of Dr. T. R. Lewis that the chylous urine not unfrequently met with in India is associated with and apparently due to the presence of an entozoon, the *filaria sanguinis hominis*, in the blood. It is supposed that the entozoa block up some of the lacteals and give rise to a communication between these and bloodvessels. Dr. G. R. Bouyun, of Demerara, has described (Golding Bird's *Urinary Deposits*, 5th Edit. p. 422. London, 1857) some cases of this disease in which the chylous state of the urine was always accompanied by attacks of irritation, fever, emaciation; while he seems to prove that the affection is often epidemic at Demerara, especially amongst creoles and negroes. Dr. Bouyun refers it to some derangement of the assimilative functions; and he has been successful in curing it by the free administration of a decoction of the mangrove bark (Rhizophora racemosa), which acts freely on the skin, alters the character and increases the quantity of the urine, and improves the general health.

Examples of chylous urine are rarely met with in Europe; more than half of the instances recorded having occurred in individuals resident in hot climates, or in the natives of the East and West Indies, Mauritius, Brazil, &c. The appearances presented by the urine are these:—It is usually opaque and of a cream colour, owing to the presence of molecular fat, which can be dissolved by ether; on cooling it forms into a trembling coagulum, though after several hours this substance breaks up and liquefies; the presence of albumen is shown by testing with nitric acid and heat; the specific gravity is low; and examined microscopically, minute fatty granules with numerous chyle corpuscles are seen.

The invasion of this disorder may be gradual or sudden. The symptoms are usually intermittent; that is to say, an attack lasts for a few days or weeks, and then passes off perhaps for months. The way in which the character of the urine varies at different times in the twenty-four hours has already been noticed. In the intervals of health, the urine is natural: there is no albumen present, nor any abnormal ingredient. While the urine continues chylous, the general state of the system is depressed. The patient complains not only of bodily weakness, but he is exceedingly anxious about himself. He loses flesh. There is considerable lassitude, taking away all desire for exertion of any kind. Moreover, there is often pain about the loins, tenderness in the epigastrium, a difficulty in digesting solid food, with a tendency to restless nights.

The remedies which can be opposed to this condition are few and for the most part ineffectual. So far as is at present known, astringents are the agents from which most is to be hoped; while of the different drugs of this class, gallic acid in large doses is the best. The tincture of perchloride of iron has now and then answered for a time. A decoction of mangrove bark (Rhizophora racemosa) seemed to cure one case. A tight belt, worn round the loins, gives relief to the backache. Residence in a bracing air ought also to be recommended.

VII. RENAL ENTOZOA.

The entozoa which may infest the kidney are of three kinds—Hydatids, the Eustrongylus gigas, and the Bilharzia, or Distoma hæmatobium.

With reference to *hydatid* formations it is not necessary to detain the reader long; since these entozoa, which are in reality the six-hooked embryos of the tænia echinococcus, have already been described, as they have their seat in the liver, an organ which they affect more frequently than all the other tissues combined. Hydatids in the kidneys are very rare. Only one gland is affected, and usually there is merely one parent cyst containing many secondary or daughter cysts. Sometimes a spontaneous cure seems to take place; but in other instances there is a continuous though slow development, until a tumour of considerable size gets formed. Under these circumstances, inflammation and ulceration are at length set up; and an opening takes place between the tough opalescent walls of the cyst and the loins, or the bowel, or the pleura and perhaps a bronchus. Not uncommonly, the cyst bursts into the pelvis of the kidney; when probably small cysts and shreds of large ones, with echinococci and their hooklets, will pass down the ureter into the bladder, and thus be voided with the urine. During this transit they may cause pain and nausea, with sero-purulent or bloody urine, such as is produced by the passage of a renal calculus; while they are likewise apt to temporarily obstruct some portion of the urinary passages, and so to give rise to difficult micturition or even to complete retention of urine. It is probable that perfect recovery in these cases is not so rare an event as might be prognosticated.

The *Eustrongylus gigas* (known also as the Strongylus gigas, Ascaris renalis, Lumbricus in renibus, &c.) occurs so seldom in the human subject that I do not think a single kidney containing it has been shown at the Pathological Society of London in twenty-two years; while I am not sure that there is more than one specimen of it in the Hunterian Museum. Nevertheless this entozoon, the Antæus of the round worms, not unfrequently destroys the renal structure in the weasel, otter, raccoon, dog, ox, horse, &c.; while it has been found to be the origin of fatal mischief in man. The eustrongylus has a cylindrical elastic body, is of a blood-red colour, and is slightly attenuated at both extremities; the male measuring about one foot in length and a quarter of an inch in breadth, while the female is three times as long and twice as broad. The symptoms produced by this worm very much resemble those caused by a renal calculus. Thus, there is pain in the loin, purulent and sometimes bloody urine, with considerable constitutional disturbance if the worm escapes into the ureter and blocks it up. If the impediment remain, hydronephrosis will result from the retention of urine in the pelvis of the kidney; thus giving rise ultimately to a tumour in the lumbar region. Where the ureter remains permeable, it has been suggested that a microscopical examination of the urine might lead to the detection of the oval-shaped ova; which are numerous, and measure the one three-hundredth of an inch in length. The patient, however, would not be likely to benefit very much by the discovery, if the second suggestion of an authority on these matters was followed—the making of an incision into the kidney to remove the intruder. The Distoma hæmatobium or Bilharzia capensis, is a small entozoon which inhabits the kidney, and occasionally also the prostate or other parts, giving rise to hæmaturia, small in amount, but frequently repeated. Hæmaturia, having its origin in the presence of this parasite, is endemic at the Cape of Good Hope and other parts of Africa. Dr. John Harley was the first in this country to detect the cause of this form of renal hæmorrhage by discovering the eggs in the urine of a case which came under his care. They are generally entangled in little blood clots, and these may give rise to obstruction in their passage along the urethra. Bilharz had previously described the same or a similar affection, and gave to the parasite the name of Distoma hæmatobium; it is still uncertain whether this is identical with the parasite whose eggs and embryos were found by Dr. Harley, and to which the name of Bilharzia was given.

No treatment has yet been found efficacious in destroying the parasite.

VIII. RENAL CALCULI.

Urinary calculi are found either in the kidneys, or in the bladder, or in the follicles of the prostate gland. In very rare cases one or more of the urinary salts become deposited in the ureters, or in the urethra; but usually the calculi found in these situations have travelled there from the kidneys or bladder. Urinary calculi are not peculiar to man; being also found in oxen, horses, sheep, pigs, and very frequently in rats. These concretions are formed of concentric layers of crystalline or earthy inorganic matters or salts, with a variable proportion of organic matter. A few are composed of only one constituent: others are of a composite nature, the composition of the different layers alternating. Thus urate of ammonia and oxalate of lime are frequently associated in the same stone.

The chief *varieties* of calculi are the Uric acid; the Urates of Soda and Ammonia and Lime; the Fusible calculus—Phosphate of Lime, with Phosphate of Magnesia and Ammonia; the Mulberry calculus—Oxalate of Lime; the Carbonate of Lime; and those very uncommon forms, the Cystic and Uric or Xanthic Oxides. Pseudo-calculi of fibrin or blood-coagula, or of urostealith (a resinous or fatty substance) are exceedingly rare.

Urinary concretions, whatever may be their composition, vary very much in size. Thus, they occasionally merely resemble grains of sand, being so small as to pass readily with the urine. Particles of gravel thus voided will be found made up of aggregated crystals of the urinary salts, so that they are really microscopic calculi. In other instances, however, they are discovered as large as a small orange. When a stone has formed in the pelvis of the kidney, it may, while of moderate size, enter the ureter and gradually be forced onwards towards the bladder. The suffering which takes place during the transit is very great, and is popularly known as "a fit of the gravel." But as soon as the calculus reaches the bladder, all pain is over for a time; and if it be true, as some philosopher has remarked, that the height of happiness is sudden relief from great suffering, the patient is indeed a happy man.

One or more calculi may, however, not only form in the kidney but remain there; gradually growing and filling the entire pelvis. Possibly this will happen in both glands. But in any case, the presence of one or more stones in the kidney is a most unfortunate circumstance. The concretions produce, by their mechanical action, well-marked *symptoms;* the chief of which are almost constant backache, bloody urine, and reflex irritation of distant organs. The pains, as well as the attacks of hæmorrhage, are increased by walking exercise, and by a jolting drive. The urine is usually albuminous, and by the microscope blood corpuscles and pus will be found, sometimes with epithelium which, by its characters aids in ascertaining the situation of the calculus. The blood corpuscles and epithelial particles are usually more numerous after exercise or jolting. Alcoholic drinks can rarely be taken with impunity. After a time, the general heath suffers to a considerable extent. As the foreign body increases in size, so it encroaches on the true structure of the kidney; and either converts the gland into a large cyst, or perhaps sets up suppurative inflammation. Now and then ulceration has extended through the kidney and the loins, one or more stones having passed out of the opening thus made. More commonly, however, death occurs from uræmia; the secreting structure of the kidneys becoming entirely destroyed.

The symptoms attending the passage of a calculus along the ureter are often extremely severe. There is excruciating pain in the loin of that side shooting down into the bladder, testicle, and thigh, violent sympathetic vomiting, and sometimes marked collapse. The testicle is often drawn up and there may be blood in the urine.

In the *treatment* of cases of renal calculi we have, first, to relieve the general symptoms; secondly, to endeavour to prevent the formation of fresh stones, as well as to check the further increase in size of such as already exist; and thirdly, when a calculus enters the ureter we must facilitate its passage to the bladder.

The *first* indication is to be accomplished by supporting the health with a plain diet. Milk, cream. animal food, and raw eggs, are beneficial. I am convinced that alcoholic drinks usually prove injurious; but if something of this kind must be allowed, it will be best to prescribe certain specified quantities of brandy or whisky well diluted. All kinds of beer and wine had better be avoided. Cod liver oil will often be useful. The pain in the back may be best relieved by the application of belladonna plasters; and by wearing thick flannel, or chamois leather jackets next the skin. To check the hæmorrhage we should order either the tincture of perchloride of iron (F. 101, 397), or the iron alum (F. 116); but at times, when the loss of blood is greater than usual, no remedy answers better than gallic acid (F. 103).

The plan to be pursued under the *second* head, must vary with the supposed nature of the calculus; although in all cases more than the customary quantity of fluids should be consumed. Pure water is most serviceable, but it is difficult to make some patients think so; and hence it is often advantageous to prescribe large quantities of simple aërated water. In the *uric acid* diathesis, a vegetable diet, avoidance of alcoholic drinks, the free use of simple diluents or of mucilaginous drinks, gentle exercise, attention to the bowels, and the employment of alkaline aërated waters—as those of Vichy or Carlsbad—will be beneficial. Alkalies often give relief, and none can be employed so advantageously as the salts of potass; since soda often combines with the uric acid to form a hard and insoluble salt, while magnesia in large doses is very apt to cause intestinal concretions. The bicarbonate of potass may be freely given, without any of these disadvantages, or the citrate, which being a neutral salt, is more grateful, and disturbs the stomach less, while it is decomposed in the system into carbonate of potash, which renders the urine alkaline; the liquor potassæ in large doses (min. xxx in water fl. oz. 3) is also an agent possessing valuable properties which appear to have been generally overlooked. Its effect, however, in inducing alkalinity of the urine is less than that of the carbonate or citrate, but it oxidizes effete matters, and is a more powerful eliminant than the salts of potash. For the *phosphatic* diathesis, a directly opposite course of treatment will be necessary; but it must be borne in mind that alkalinity and phosphatic deposits due to decomposition of the urine with formation of carbonate of ammonia do not constitute this condition of system. In the phosphatic diathesis the urine is rendered alkaline by fixed salts, and the blue colour of litmus or brown of turmeric is not changed by drying and exposure to heat as in the case of ammoniacal urine. The diet ought to be generous, a moderate allowance of whisky or brandy may perhaps be allowed, and tonics (such as bark, iron, and the mineral acids, especially the nitro-muriatic) should be administered every now and then. Opium is also a valuable drug in these cases. Complete mental relaxation must be insisted on. As regards the *oxalic-acid* diathesis, all articles of food containing this agent—such as the common garden rhubarb—must be avoided: saccharine substances also ought to be disallowed. The nitro-hydrochloric acid will generally prove useful (F. 378); and tepid or cold bathing, change of air, &c., should be recommended.

In the *third* place, we may be called upon to relieve the great suffering caused by the passage of a calculus down the ureter. This will perhaps be most readily effected by the prolonged use of the warm bath; by the free use of emollient diluents—especially by barley-water containing a couple of fluid drachms of the spirit of nitrous ether; as well as by putting the patient under the influence of chloroform, or else by the administration of full doses of opium. The subsequent passage of the stone from the bladder will be facilitated by the patient allowing the urine to accumulate, and then getting him to discharge it with force while he is in a hot bath; or by introducing a large silver catheter with an open extremity, and washing out the bladder with warm water. When the calculus is too large to be thus got rid of, surgical interference—lithotrity or lithotomy—will subsequently be required; no satisfactory plan for producing solution within the bladder having yet been discovered. With regard to the selection of crushing or extraction, as well as for full information on the mode of operating, reference should be made to the writings of Sir William Fergusson, the Messrs. Coulson, and Sir Henry Thompson.

IX. TUBERCLE AND CANCER OF THE KIDNEY.

Renal tuberculosis is rarely a primary disease, being usually associated with pulmonary phthisis. It may, however, be met with when there is no obvious disease of the lungs. The first symptom is usually an attack of hæmaturia, and the loss of blood may be considerable in amount, and may be repeated several times. There is more or less pain in the loin corresponding to the seat of the disease, occasionally of a burning character. The urine contains pus and blood, together with much albumen; sometimes the pus is present in large amount, giving rise to irritation of the bladder, and causing this organ to be suspected as the seat of the disease; sometimes also there are small cheesy-looking masses, visible to the naked eye; while a minute examination may perhaps detect tubercular matter, granular débris, and epithelial casts of the tubes. The gland may be much enlarged; owing either to the confluence of softened tubercular deposits, or to the gradual distension of the pelvis by retained urine and pus. There are night-sweats, rapid emaciation, and attacks of diarrhœa. Death usually occurs in from twelve to eighteen months after the commencement of the symptoms indicative of kidney affection; while the fatal result may be due to exhaustion, or more rarely to uræmia or pyæmia. Occasionally it happens that the disease gives rise to so little pain or inconvenience or impairment of health that the case only comes under observation when the symptoms of uræmia have set in. On examination after death the kidneys are found studded with masses of yellow tubercle, the pelves are also extensively affected, and contain pus and disintegrated tubercular matter. Tubercles will be found in other organs and in neighbouring parts; in females the Fallopian tubes especially are usually the seat of tubercular disease. In a few instances, the kidneys of newborn infants have been found in a state of disorganization from the degeneration of tubercle.

Cancer is probably the rarest form of renal disease. Dr. Walshe has collected forty cases of cancer of the kidney from different sources. In thirty-one of these, pure encephaloid—or one of its varieties—was the species of cancer observed, while there were only five cases of scirrhus. The disease affected both organs sixteen times, the right alone thirteen times, the left alone six. Cancerous degeneration, like many other forms of renal disease, commences usually in the cortical substance, and thence extends to the medullary cones and to the walls of the pelvis and ureters.

In one instance of renal cancer about which I was consulted by Dr. Greenhalgh (in 1849 and 1851), the gland was enlarged to such an extent, that it simulated in many respects a solid ovarian tumour, and had indeed been diagnosed as such. On the two occasions when I saw the patient she was pregnant; and consequently, as only an incomplete examination could be made no positive opinion was given, though I was certainly inclined to regard the tumour as ovarian. After death the right kidney was found to be the seat of disease, being enlarged at least to the extent of two adult heads.—I am acquainted also with the particulars of a similar case where the tumour was diagnosed as ovarian, and where tapping was had recourse to (in 1864). But although only a little blood came away through the cannula, the true nature of the affection was not suspected by the operator until an examination after death revealed it.—And I have heard of a third instance, in which the abdomen was opened (in 1865) for the removal of a supposed ovarian tumour. The patient died; and at the autopsy the disease was found to consist of an encephaloid (left) kidney.

Dr. Owen Rees states that the following are the chief points to be noticed in the *diagnosis* of malignant disease of the kidney from calculus:—1. In malignant disease the blood is generally passed in larger quantity than in calculus of the kidney. 2. There is more frequent tendency to nausea *on slight occasion* than in calculous disease. 3. Microscopical examination of the urine will frequently show pus or mucus in excess, if there be calculus; whereas in malignant disease this sign does not so frequently exist. 4. The appearance of those suffering from malignant disease of the kidney is nearly always indicative of a state of anæmia more or less advanced. 5. In calculus, hæmaturia generally follows upon some unwonted exertion. 6. Careful examination of the abdomen will frequently lead to a detection of tumour, if there be malignant disease of the kidney. It is not always an easy matter to distinguish *tubercular disease of the kidney* from cancer, but a consideration of the chief features presented by the former will be of assistance. Villous disease of the kidney has been met with, giving rise to hæmaturia, and ultimately to suppurative inflammation. This disease is extremely rare, and presents no characteristic feature by which it may be distinguished.

The connective tissue around one or other of the kidneys is now and then the seat of medullary cancer, giving rise to a tumour of perhaps very considerable size. The kidney itself may remain perfectly free from any malignant disease; though it will perhaps manifest indications of more or less advanced fatty or other degeneration, owing to its nutrition being impeded by the pressure of the surrounding disease. The amount of albumen in the urine, and the prominence of other symptoms of renal disease, will necessarily depend upon the duration of life after the pressure on the kidney or its bloodvessels has begun to be appreciable. Cancer in this situation has been found in young children more frequently than in adults. Renal cancer itself, however, has been a cause of death during infancy.

If the urine be microscopically examined either in malignant disease of the kidney or bladder, it will generally be found to contain cancer cells; together with fibres of connective tissue, blood-corpuscles, &c. In renal calculus, the epithelium of the pelvis of the kidney is sometimes rapidly exfoliated; while as these cells are of a caudate and irregular form they are very likely to be mistaken for cancer cells. The spindle-shaped epithelial cells of the ureter also bear a close resemblance to the cells of scirrhus. The general symptoms will, however, aid the diagnosis; for in advanced renal cancer there is usually considerable pain in one or both loins, attacks of nausea and vomiting are very frequent, the malignant cachexia is present, the loss of flesh and strength increases daily, and the enlarged gland can be distinctly felt.

In the *treatment* we can only do good by supporting the patient's strength; while every endeavour is made to relieve the suffering with subcutaneous injections of morphia, opiate suppositories, &c.

X. DISEASES OF THE URETERS.

I am not aware that disease of the *ureters*, occurring primarily, has ever been diagnosed during life. After death, one or both of these canals are not unfrequently found considerably dilated (perhaps to the size of the small intestine), or much contracted. Both these conditions may be due either to some congenital malformation, or to the pressure of morbid growths, or to obstruction from an impacted calculus or an entozoon, or to the extension of disease downwards from the kidney or upwards from the bladder. One remarkable case of *hydronephrosis* [῞Υδωρ = water + νεφρὸς = the kidney], or dropsy of the kidney, has been recorded by Rokitansky, and another by Kussmaul; in both of which the right ureter had become obstructed, owing to compression by an irregular branch of the renal artery. This form of sacculation or dropsy of the kidney, the result of obstruction by calculi, tubercular, or malignant deposit, the pressure of tumours, &c., is not so very uncommon. The hydronephrosis is usually single, the obstruction occurring in only one ureter; but it will be double in the event of the obstructing medium being of such a nature that it influences both ureters. In the latter cases, the mischief most frequently consists of an impervious urethra; so that the bladder, ureters, and pelves and calyces of the kidneys all undergo dilatation. Children thus malformed, if born alive, only survive a few days; unless the canal of the urethra become pervious, as it may, and then life can be prolonged for some time.—Dr. Hillier has reported the interesting history of a boy who, for five years derived relief from the repeated tappings of a congenitally dilated kidney. So considerable had been the distension of the pelvis of the kidney, and so great the resulting abdominal enlargement, that the case was at first mistaken for ascites. The boy, when between eight and nine years of age, died (in 1869) from acute tuberculosis. The right kidney was found converted into an enormous cyst, containing more than five pints of urinous fluid.—Two remarkable cases of hydronephrosis have also happened, in which the cysts have been diagnosed as ovarian, and death has occurred from attempts at extirpation. The *first*, was a patient of Dr. Baum of Göttingen, and was operated upon on the 28th November, 1864. Twenty-five pints of fluid were removed from the cyst, and it was then tried to draw out the latter; a proceeding found to be impossible owing to the adhesions between the cyst and the transverse and descending colon. She died at the end of about fifty hours. At the autopsy the left kidney was found to form the tumour.—In the *second* instance, it was likewise a cystic development of the left kidney which several gentlemen regarded as an ovarian growth. Mr. Spencer Wells operated on the 3rd January, 1867. About fifteen pints of pea-soup-looking-fluid were withdrawn from the cyst; but this structure could not be extracted in consequence of its adherence to the intestines and abdominal wall &c. Death took place thirty hours afterwards. An examination afterwards revealed the true nature of the disease; the renal cyst being the size of an adult head.

XI. IRRITABILITY OF THE BLADDER.

Irritability of the bladder is said to exist when an individual is troubled with a much more frequent desire to pass urine than is natural. This condition not uncommonly arises from organic disease of the kidneys, bladder, prostate gland, or urethra; such as inflammation, abscess, tumour, cancer, stricture, and so forth. It may likewise be due to the pressure of the uterus when misplaced (as in anteflexion), or when enlarged from pregnancy or the growth of a fibroid tumour, or when diseased from infiltration with cancer; or it may be connected with the presence of a tumour or a calculus in the bladder; or it can be originated by the irritation of hæmorrhoids, by cancer of the rectum, by a painful ulcer of the sphincter ani, or by an abscess at the side of the rectum. Lastly, it may prove, as it very often does, to be merely functional—*i.e.*, dependent on some morbid state of the urine, such as the presence of uric acid or urates in excess, or of oxalates, owing to derangement of the digestive organs or kidneys or bladder, or on some constitutional nervous affection.

Symptoms.—The desire to micturate comes on suddenly and very frequently, so that in many cases a patient has to pass urine every thirty or forty minutes. There is generally an inability to resist the desire; but if this can be checked, uneasiness and pain are induced by doing so. The urine is seldom increased in quantity, except in hysterical subjects: in the latter the increase is often considerable and the secretion is pale and very watery, the proportion of solid constituents remaining as in health. After this affection has lasted some time, the bladder often diminishes very much in size; so that instead of being able to contain from fifteen to twenty ounces of urine as in health, it cannot hold more than two or three ounces.

In all cases the urine should be examined. Where it is found preternaturally acid or alkaline; loaded with urates, or phosphates, or oxalates; or when it contains pus, albumen, sugar, or any other morbid secretion, the disease must be traced to its origin. For under these circumstances the irritability of the bladder is a mere symptom of either some severe constitutional derangement, or else of dangerous organic disease.

Incontinence of urine in children is frequently due to simple irritability of the bladder, or to the presence of worms in the rectum; or it may be associated with albuminuria, or with diabetes, or with the uric acid diathesis; or it will be simply the natural consequence of the child being put to bed for twelve hours without being roused at proper intervals to pass water. When there is an involuntary flow of urine in the adult, it is almost always indicative of an overloaded bladder from paralysis of the muscular coat.

Treatment.—In simple irritability of the bladder, not of long duration, attention to regimen generally, the avoidance of all stimulating drinks, the substitution of cocoa or chocolate made with milk for tea and coffee, the free employment of mucilaginous diluents, and the use of warm or tepid salt water baths will often effect a cure. The dilute nitro-hydrochloric acid in decoction of pareira, with or without the tincture of belladonna (F. 378), is very efficacious when the urine is alkaline or only slightly acid: where the secretion is abnormally acid, small doses of liquor potassæ, or what is more effectual with less disturbance of the stomach, citrate of potash in doses of twenty or thirty grains in infusion of buchu (F. 69), do great good. Sir Henry Thompson has also recommended a decoction of the triticum repens or couch-grass made with one ounce of the underground stem to a pint of water, the whole of which is to be taken in the twenty-four hours. Opiate suppositories at bedtime, or five or eight grains of the extract of henbane in a pill, or ten or fifteen minims of tincture of belladonna in infusion of linseed, will lessen the irritability, and allow of a good night's rest. In severe and obstinate cases a grain of morphia dissolved in an ounce of water injected into the bladder previously emptied may effect a cure.

Ferruginous tonics should be ordered where there is general debility, or when the irritability comes on in young females at the catamenial periods. In a few obstinate cases the tincture of cantharides, with or without the tincture of the perchloride of iron, has relieved all the symptoms after other means have failed. Moreover, in women, the employment of vaginal pessaries of belladonna and oxide of zinc (F. 423) will frequently prove most serviceable.

The troublesome involuntary flow of urine during sleep, which is so common in young children, may result from any of the causes of incontinence: hence in all cases of the kind the renal secretion should be examined. But usually this affection is the consequence of bad habits; being favoured by the free use of fluids during the after part of the day, by exposure to cold in the night, and by lying on the back—a posture which seems to be very unfavourable to the retention of the urine, especially when the natural sensibility of the mucous membrane of the neck of the bladder is at all increased. The disorder can usually be cured by making the little patient almost abstain from fluids for three or four hours before going to bed: by waking him to empty his bladder twice or thrice during the night: by tying a cotton reel over his spinal column, so that when he turns round upon his back he may at once be awoke: and by giving strength and tone to his system by the administration of the tincture of the perchloride of iron with small doses of belladonna. In some inveterate cases, the application of a succession of small blisters over the sacrum has effected a cure: but such agents should be avoided, if possible. Where the bladder is very irritable, a belladonna plaster over the loins and sacrum will often be very useful; or three or four grains of the extract of this drug mixed with some glycerine of starch should be spread over the same region every night, or the belladonna liniment properly diluted can be employed. Where there is a weakly condition of the general health, a tepid salt water bath every morning, with the administration of cod liver oil, may also help to effect a speedy cure. If there be any intestinal irritation, it must be removed; while any errors of diet or mal-assimilation of food ought to be rectified.

A common cause of irritability of the bladder in young boys is the presence of a long prepuce with a very small orifice. Sometimes the symptoms produced by this condition are so severe as to give rise to the suspicion of calculus. In such cases, the most marked and effectual relief will be afforded by resorting to circumcision. Drugs are certainly quite useless.

XII. SPASM OF THE BLADDER.

Like other muscular organs, the bladder is subject to spasmodic attacks of pain.

Symptoms.—The patient complains of severe pain at the lower part of the abdomen, and along the urethra to the extremity of the penis. The urine may be passed involuntarily, but generally it is retained; there being a constant desire to micturate without the power to do so. Frequently, also, there is tenesmus.

When the spasm has been of long continuance, death has resulted, with all the symptoms of suppression of the urine. In these cases the vesical extremities of the ureters have been found spasmodically closed; while the tubes themselves have been dilated by the accumulated urine, the increased dilatation sometimes extending to the pelvis of each kidney. Care must be taken not to confound spasm with inflammation of the bladder: in the latter the pain is constant, lancinating, and throbbing; while there is also general fever, and great disturbance.

Causes.—Stone in the bladder is one of the most frequent causes of violent paroxysms of spasm; malignant vesical tumours also produce them; and they are not uncommon in diseases of the rectum and uterus. So far as the bladder is concerned, a fibroid tumour in the anterior wall of the uterus will cause almost as much spasmodic pain as if the morbid growth had its seat actually in the coats of the bladder. In cancer of the womb the bladder gets contracted and morbidly sensitive long before an examination can detect any structural disease in it. Dr. Prout says that spasm of the bladder may arise from the presence of abnormally acid urine, as in gout; or from an abscess of the kidney; or from ulceration or other organic diseases of the bladder, prostate gland, &c.; or from the use of irritating diuretics, as cantharides; from excessive venery; from hysteria; and from disorders of the intestinal canal, especially, perhaps, from the irritation of oxyurides.

Treatment.—Two indications present themselves—viz., the immediate relief of the spasm, and the removal of the cause. The first will be best accomplished by the hot bath, or by fomentations until a bath can be obtained; as well as by the administration of a full dose of some narcotic either by the mouth or by the rectum. The removal of the cause is more difficult. Where the patient is gouty and the urine loaded with urates, colchicum and soda or potash or lithia water will do much good; while at the same time attempts can be made to induce an attack of gout in the foot, by the application of sinapisms, or by the use of stimulating pediluvia. In abscess of the kidney, the symptoms must be palliated as they arise; the spasm in these cases being due to irritation by pus descending from the kidneys may be relieved by washing out the bladder with a weak solution of carbolic acid to which morphia may be added; the strength being kept up by mild nourishing food, cod liver oil, change of air, &c. When a vesical calculus is present, the physician can only give temporary relief until a surgeon takes the necessary steps to crush or extract the stone. Supposing the spasm to be due to sympathy with a contiguous organ the disease of which cannot be removed, frequently repeated doses of the tincture of perchloride of iron often prove of great service. Camphor mixed with a linseed poultice and applied to the perineum, is also said to be frequently serviceable; or a hemlock poultice may be tried. But the quickest relief will be obtained from a mixture containing ether and morphia and belladonna (F. 315); or from a subcutaneous injection of morphia and atropia, or especially from an opiate and belladonna suppository (F. 340).

In every case the diet is to be regulated. Simple nourishing food, an avoidance of all stimulants, a free supply of milk, and plenty of mild mucilaginous drinks should be recommended. The patient also ought to wear flannel next to the skin, to protect himself from sudden changes of temperature; while he must avoid sexual intercourse, riding on horseback, and every kind of violent exercise.

XIII. PARALYSIS OF THE BLADDER.

The muscular coat of the bladder may become paralysed from some influence confined to this viscus; or from disease of the nervous centres, inducing loss of muscular power in other parts of the body; or from constitutional debility arising from any cause.

Causes.—The paralysis may be due to over-dilatation of the muscular coat of the bladder. Thus, a sensitive individual from some cause (as being in the company of the opposite sex, or from being shut up in a railway carriage) is unable to micturate when the desire is felt; and then, on afterwards attempting to do so, it is found that the power is completely lost.

The paralysis may also be a consequence of apoplexy, or of injuries to the head, or of injuries or diseases of the spine.

It is, generally speaking, a disorder of old age, and seems particularly to attack gouty and rheumatic persons. Not uncommonly it is connected with disease of the neck of the bladder; or with enlargement of the middle lobe of the prostate gland.

Women who have had large families, and especially such as have experienced severe labours, oft-times suffer from paralysis of the neck of the bladder; so that they are either unable to retain the urine at all, or it comes away involuntarily on laughing and coughing, or on making any sudden exertion. The same thing is apt to happen with very obese women. Time, astringent vaginal injections (F. 425), pessaries containing a little tannic acid (F. 423), cold hip baths, and ferruginous tonics often effect a cure.

Symptoms.—Unlike the rectum, the bladder retains its contents when paralysed; this phenomenon being due to some peculiarity in the neck of the bladder not possessed by the bowel. The sphincter vesicæ consists only of pale muscular fibres mixed with elastic tissue placed round the neck of the bladder; the elastic tissue modifying materially the action of the muscle. "The same loss of power," says Mr. Coulson, "which allows the escape of fæcal matter through the paralysed sphincter ani, does not affect to a similar degree the sphincter vesicæ, whose elasticity, inherent in the tissue itself, and not dependent upon nervous influence, retains closed the vesical orifice when the rest of the organ is paralysed."*

When the bladder gets over-distended, the urine dribbles away by the urethra; the resistance to its escape at the neck of the bladder being overcome when the walls are incapable of further dilatation. Hence incontinence of urine is often the prominent symptom of retention, of which fact the following is a good illustration:—Mr. Lawrence was one day sent for to see a case of supposed irritability of the bladder. The medical practitioner in attendance stated that he had been doing all in his power to allay the irritability, but that his efforts were unavailing; for the urine passed off as quickly as it entered the bladder. On examination Mr. Lawrence felt the fundus of the bladder forced up some way above the umbilicus: he introduced a catheter, and five pints of urine were withdrawn. The truth was that the bladder had been allowed to become distended for about five days; and in consequence of this, unfortunately, the patient never afterwards recovered the natural power of emptying this viscus.—I have several times seen cases where alarming symptoms have set in about the third day after parturition, owing to the excessive accumulation of urine; the practitioner in attendance having failed to perceive the true nature of the case, because the patient was complaining of constantly passing water. The introduction of a catheter, however, has speedily removed all doubt, as tumblerful after tumblerful of urine has been drawn off. The paralysis seldom lasts for more than two or three days subsequent to the proper treatment being resorted to; but the catheter should be used every eight or twelve hours until it is certain that the patient completely empties the bladder upon each attempt at micturition.

In most cases of paralysis of the bladder, the urine is found loaded with mucus; while it is of a highly offensive ammoniacal odour, of an alkaline reaction, and the phosphates—the neutral triple phosphate of magnesia and ammonia and phosphate of lime—are precipitated. It is highly probable that the urine when secreted is of acid reaction; but on flowing into the bladder it becomes mixed with a greater or smaller quantity of fluid which has been retained a sufficient time to undergo decomposition, and hence the fresh secretion gets contaminated. In injuries of the spinal cord the vital power of the walls of the bladder is so lowered that the urine readily becomes decomposed. The urea is converted into carbonate of ammonia; while the ammoniacal urine inflames the vesical mucous membrane, so that the latter secretes a remarkable quantity of viscid ropy mucus. If the patient survive, the inflammation may extend to all the coats of the bladder, and it sometimes gives rise to ulceration which may perforate the walls of the bladder and allow the urine to be extravasated.

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* *On Diseases of the Bladder and Prostate Gland.* Fifth Edition, p. 98. London, 1857.

One of the earliest symptoms of paralysis of the bladder is pain at the neck of this viscus and in the glans penis; but after a time, little or no uneasiness is complained of, and as the bladder loses its sensibility even the desire to void urine is not experienced. The constitutional disturbance is usually severe; the pulse is rendered quick and feeble, the tongue gets furred, the appetite fails, the nights are restless, there is great mental depression, and the vital powers become greatly lowered. Frequently the patient sinks into a state of stupor, and dies from uræmia or from exhaustion.

Treatment.—Where the paralysis depends upon over-distension of the bladder the catheter must be introduced; although it is sometimes advisable to be careful not to withdraw the fluid too rapidly, since fatal collapse is said to have occurred from the sudden abstraction of a large quantity of urine. It is necessary also to be scrupulously careful that the catheter employed is perfectly clean, since cases have occurred in which after the passage of a catheter the urine, previously healthy, has at once become ammoniacal, probably from the introduction of matters which have acted as a ferment and induced decomposition. When the paralysis continues, the patient should be taught to introduce the catheter for himself, using as large an one as the passages will freely allow. Especially should he be cautioned always to withdraw every drop of urine; inasmuch as that which is retained will after a time become decomposed, and not only contaminate the fresh secretion as it flows from the ureters, but also give rise to most serious changes in the mucous and other coats of the bladder. The instrument should be passed about every six or seven hours. Now and then the bladder had better be washed out with warm water, to which a very small quantity of carbolic acid may often be added with advantage.

To restore the contractile power of the bladder various remedies have been recommended. In recent cases, the use of the catheter occasionally suffices to give tone to the vesical walls; sometimes cold water injections, as recommended by M. Civiale, prove beneficial; and good results are, in many instances to be obtained from small doses (the one-twelfth of a grain twice daily) of strychnia, or from the use of the ergot of rye. Galvanism, cold douche and hip baths, blisters over the lower part of the spine, quinine and iron, and aloetic purgatives are also remedies that can be often resorted to with advantage.

When there is disease of the brain or spinal cord, we can seldom hope to do much good beyond taking care that the bladder does not become distended; at the same time attempting, as far as possible, to combat the symptoms as they arise.

XIV. INFLAMMATION OF THE BLADDER.

Inflammation of the bladder, technically known as cystitis or cystorrhœa, is not a very frequent disease. Probably one reason for this is, that directly any morbid action is set up in this viscus advice is eagerly sought, since the symptoms at once become urgent. Of the two forms of inflammation the acute is much the most uncommon. The chronic variety falls under the observation of every practitioner, and often gives him much trouble in his attempts to effect a cure.

Acute or chronic cystitis may now and then complicate uterine affections in women; or either will result from a tedious labour, owing to the long-continued pressure of the fœtal head.

1. ACUTE CYSTITIS.

Acute inflammation of the bladder, or cystitis [Κύστις = a bladder; terminal *-itis*], is a severe disease which occurs under a variety of circumstances. The morbid action is generally confined to a portion of the mucous surface, the neck and bas-fond being the parts most frequently affected; but in severe cases the whole bladder and all its coats are attacked.

Causes.—This disease now and then arises as an idiopathic affection: in the great majority of cases, however, it supervenes on long existing chronic inflammation. It may have its origin in the extension of inflammation from the urethra, or from some of the pelvic viscera, or from the connective tissue (pelvic cellulitis). Gonorrhœa, in men, is a frequent cause; and so are caustic injections to the urethra. Cystitis can also be produced by external violence, as by wounds; by the pressure of tumours of the uterus or ovary, or of effusions of blood (pelvic hæmatocele); or it will be found due to the irritation of some foreign body—as a calculus, or to the abuse of diuretics, cantharides, &c. Protracted retention of urine has undoubtedly set up fatal cystitis; the inflammation being partly a consequence of the distension, and partly a result of the irritating effect of the urine.

Symptoms.—The symptoms of acute cystitis are the following:—Shivering, considerable pain over the bladder, and heat of the urethra; together with a constant desire to pass urine, which is voided in very small quantities at a time. There is likewise high fever, nausea, mental depression, and general constitutional disturbance. The bladder can often be felt on making pressure over the lower part of the abdomen, as a small and rounded tender tumour. The pain is usually very severe, extending along the perineum and urethra, as well as down the thighs; while it is much increased by pressure upon the lower part of the abdomen, or by examining the posterior wall of the bladder through the rectum. Moreover, this pain diminishes in severity directly the bladder is emptied; but as soon as a small quantity of urine collects the suffering recommences, becoming more and more severe until the desire to micturate is rendered so irresistible that the patient feels compelled to respond to it. Frequently, the irritation extends to the rectum; and then the sufferer is annoyed with tenesmus and evacuations of mucus tinged with blood.

Unless the progress of the inflammation be controlled in the course of two or three days, the pain becomes unbearable, the calls to micturate are constant, the urine is expelled in drops, and the walls of the bladder lose their power, so that an accumulation of urine takes place. This secretion is found high-coloured, perhaps fetid and alkaline, and sometimes loaded with shreds of fibrin entangling pus and blood corpuscles. As the morbid action continues, the neighbouring tissues get involved in the inflammation: the ureters, prostate, vagina, or pelvic connective tissue may become affected. The constitutional disturbance rapidly increases, considerable prostration ensues, cold clammy sweats cover the body, the pulse becomes very feeble, low muttering delirium sets in, and death relieves the sufferings between the seventh and twelfth days. In less violent cases resolution sometimes takes place, and the patient recovers: or the inflammation (if limited in extent) ends in softening of the mucus membrane with ulceration, and then gives rise to much pain and disturbance subsequently.

A few curious cases have been recorded where the whole mucous lining of the bladder has been thrown off in one piece. In the museum of the Royal College of Surgeons there is a preparation (Pathological Specimens, No. 1993) which illustrates the correctness of this remark. The history of the patient, communicated to me by my kind old friend, the late Dr. Knox, was as follows:—A man seventy years of age, living in Edinburgh, fell from a scaffold, and, in consequence of the injuries received, suffered from retention of urine. The catheter was introduced frequently, and a thick, puriform fluid drawn off by it. At the end of the third week, however, nothing would pass through the instrument, while the point of it could be felt to impinge upon a membrane. To relieve the man's sufferings, the late Mr. Liston, assisted by Dr. Knox, cut into the bladder from above the pubes, and thus allowed a large quantity of purulent fluid and a membrane to escape.

The patient lived for three months afterwards, discharging his urine partly through the wound and partly through the urethra: at the end of this time he died from exhaustion. On examining the layer of membrane, as it is found in the Museum, it is seen to be of a saccular form; measuring about six inches in its longer and four inches in its shorter diameter. The shape indicates that it lined the whole interior of the bladder, and was thrown off from it in one piece. The outer surface is flocculent, and in parts distinctly fibrous: the inner surface is granular and reticulated, like superficially ulcerated mucous membrane. In fact, as the College Catalogue states, it exactly resembles the mucous membrane of a bladder, separated as a slough in one piece.

Treatment.—The remedies mainly to be relied upon are those which have been recommended in the inflammatory affections of other organs; especially large poultices, very hot poppy fomentations, and often repeated hot hip baths. The mildest aperients (such as castor oil) ought to be employed to keep the bowels gently open, if there be any evidence of the retention of unhealthy secretions. Then a catheter must be used frequently if there are symptoms of retention of urine, but not without. The diet should be very light, with a moderate quantity of mucilaginous fluids—such as barley water, linseed tea, milk, arrowroot, mucilage of tragacanth, &c. Tea, coffee, and all alcoholic drinks are to be avoided. As regards drugs none will be found so useful as opium and belladonna. These agents should be used as suppositories (F. 340) if possible in men; although in women they prove much more efficacious when introduced into the vagina as pessaries (F. 423). Should a calculus prove to be the cause of the inflammation, the surgeon will probably wait until the morbid action is subdued before he ventures upon lithotrity or lithotomy.

2. CHRONIC CYSTITIS.

This form of inflammation, now and then spoken of as vesical catarrh, is far from uncommon, inasmuch as it is readily excited by numerous causes. It is sometimes the sequel of an acute attack. More often it results from some poison in the system, as that of gout or rheumatism; or it is not unfrequently due to the retention of decomposing urine (perhaps the consequence of spinal paralysis), or to the irritation of urine charged with saline diuretics; or it may have its origin in disease of some neighbouring viscus—as the rectum, or uterus, or vagina; or it may be caused by any foreign substance in the bladder, whether this be a simple or malignant tumour or a calculus. Old men, more frequently than old women, suffer from chronic cystitis, especially during cold weather, or if they are much exposed to damp. The irritation may extend from an enlarged prostate.

In simple cases, there will be merely a general sense of indisposition, an increased sensibility of the walls of the bladder, a dull kind of aching about the pelvis, and a frequent desire to pass urine; the latter being generally scanty, and containing a small quantity of mucus or pus. But sometimes, the secretion of the lining membrane becomes very greatly increased (catarrh of the bladder); and then the urine deposits a large amount of semi-transparent, viscid, and ropy matter. This adheres to the sides of the vessel containing it, and on being poured out falls away like a gelatinous mass; while it consists either of mucus, or of pus which has been modified by the admixture of an alkali.

On attempting to cure these cases, it is of the first importance to remove the cause if possible. Then, care must be taken to prevent further irritation of the mucous membrane by not allowing the urine to be retained, as it very soon becomes alkaline; and with this object the bladder should be frequently emptied by the catheter. Great relief is often derived from washing out this viscus with three or four ounces of warm water; or with six or eight ounces of water containing twenty grains of extract of henbane with three or four of extract of opium, allowing at least one-half of the fluid so medicated to come away, or after washing out the bladder, one or two grains of acetate of morphia, dissolved in two ounces of water, may be injected and retained. Where an astringent seems needed, a mixture of acetate of lead or tannic acid in warm water may be used. The strength of the injection should be such as to impart a styptic taste to the tongue.

Amongst the general remedies which may be administered, are the infusions of bearberry (infusum uvæ ursi) and buchu; or the decoctions of pareira and couch-grass. Demulcent drinks are also serviceable; especially the decoction of Iceland moss, or plain barley water, or the infusion of linseed. A suppository of opium and belladonna (F. 340) at night, will often procure refreshing sleep; but in women, a medicated pessary containing the iodide of lead or the oxide of zinc, with belladonna (F. 423), has seemed to me to act more favourably. Moreover, the application of a belladonna plaster over the sacrum is sometimes the source of considerable relief; or if we wish to produce counter-irritation (which will very rarely be the case) we can employ the croton oil, or the iodine liniment. In all cases nourishment must be given freely; animal food, raw eggs, and as much milk as can be digested being needed. Tea and coffee generally do harm; while alcoholic stimulants should only be prescribed where there is much depression, or where the patient is aged and has habituated himself to their use. If the digestive organs are weak, the administration of pepsine with the chief meals will be necessary; and as exercise must generally be forbidden, one of the preparations of this substance will very commonly be required.

XV. TUMOURS OF THE BLADDER.

The tumours which may be developed in the bladder are of the following kinds:—Warty or polypoid fibrous bodies; villous or vascular growths; and malignant tumours, or infiltrations.

Whatever the nature of the tumour may be, it gives rise to symptoms very much resembling those caused by a stone in the bladder. There is frequent micturition; a painful feeling of inability to empty the bladder is complained of; while occasionally the urine is bloody, or purulent, or ammoniacal and loaded with mucus. Malignant tumours (either scirrhous, or more commonly medullary, or epithelial) are of much greater frequency than the innocent varieties; and though the cancerous deposit is generally primary, yet it may occasionally be the result of the extension and infiltration of disease from the vagina, uterus, prostate, or rectum. The suffering is always very great; the pain at the lower part of the abdomen, in the loins, and about the thighs being constant. The urine is bloody, and often contains threads of tissue; while perhaps the diagnosis may be facilitated by the presence of cancer cells. Until the constitutional cachexia becomes marked, the symptoms are apt to be mistaken for those produced by a calculus; and though perhaps it may be unavoidable, yet considerable mischief is now and then caused by the use of the sound. I well remember finding an eminent medical friend, now dead, suffering the greatest agony after a mass of medullary cancer at the base of his bladder had been roughly treated in the futile attempt to detect a stone.

As respects the treatment of these cases we can do little more than relieve the prominent symptoms. Our chief reliance must therefore be placed on narcotics in sufficient doses to give repose, or on astringents where there is hemorrhage; as well as upon a nutritious diet. The polypoid fibrous, and the pendulous villous, growths, may occasionally be removed by ligature from the female bladder, owing to the ease with which the urethra can be dilated. But success has seldom attended these operations, partly, perhaps, for the reason that patients are often unwilling to submit to the necessary proceedings until great constitutional disturbance has set in. And then, by the time that this has got developed, the ureters and pelves of the kidneys have generally undergone considerable dilatation; or they have even become the seats of suppurative inflammation, which can have but one termination.

XVI. SPERMATORRHŒA.

The consideration of the subject-matter of this section can hardly be approached without a feeling of misgiving, if not of actual repugnance. The disagreeable term "spermatorrhœa" [Σπέρμα = seed + ῥέω = to flow] has been so grossly abused, and is so constantly employed by the vilest charlatans to intimidate their unfortunate dupes, that many practitioners would perhaps wish to ignore the topic altogether. Yet it seems to me, that to do this is merely to rush from one extreme to the other. For it cannot be denied that a morbid condition may be induced, the chief feature of which is the involuntary escape of seminal fluid; while it is as certain that the consequences of such losses, if oft repeated, are decidedly injurious to the mental and bodily health. Quite as frequently, however, the symptoms attributed to spermatorrhœa are due to overwork, or dyspepsia, or unfavourable hygienic conditions, and the lumbar pains, headache, depression of spirits, indisposition for work, and inability to fix the attention arising from these causes are set down to self-abuse, and exaggerated by an over-sensitive conscience as a well-merited punishment. The victims of this disorder, however it may have been brought about, are as much entitled to our care and consideration as those afflicted by other diseases. The physician who is familiar with the many varieties of human suffering and human weakness should be the last to acknowledge any bounds to his ministrations. It is happily no part of his duty to inquire whether the calamity be a just retribution. Suffice it that it is the obligation, perhaps rather the privilege, of his noble art to give all the relief in his power to a fellow-creature struck down by pain and sickness; whether the suppliant be the inmate of a hospital or a prison, of a palace or a hovel.

The most frequent *cause* of spermatorrhœa is self-abuse. Youths who have never received a kindly warning, and who have been allowed to grow up without being taught even the rudiments of physiology, or the necessity for moral control, contract pernicious habits before they are aware of the mischief they are inflicting upon themselves. Exciting conversations, with the perusal of "sensation" novels and newspaper reports of the proceedings in the Divorce Court, early arouse the passions and are productive of the most pernicious effects. To deny this is simply to shut one's eyes to a grave evil; an evil which is so patent to those who have the control of young men, that no very long time since (I believe it was in the year 1864) an earnest and very distinguished preacher delivered a sermon on this subject at one of our universities. But to students at college the warning often comes too late; for this bad habit is not unfrequently early and easily acquired, though it can be broken only with the greatest difficulty.

It is a common mistake to suppose that the functions of the testicles must necessarily be performed after the time of puberty. These glands may be perfectly healthy and yet quiescent; just as is the case with the mammary glands until their powers are brought into play. But when the secretion of seminal fluid has been repeatedly encouraged, a hard struggle will alone stop the continued formation of this fluid. It may be doubted whether the serious symptoms which occur in spermatorrhœa are directly due to the loss of seminal fluid, or only to the effect of the cause of this loss upon the nervous system. Seeing what occurs in women, where no discharge follows upon masturbation, I am rather inclined to adopt the second view.

The seminal fluid is composed of a semi-transparent and glutinous and alkaline fluid, called liquor seminis; of granular corpuscles, each about the $\frac{1}{4000}$th of an inch in diameter, and sometimes termed "spermatophori;" and of spermatic filaments or spermatozoa, easily recognised by a magnifying power of some 400 diameters, owing to their tadpole-like form and rapid vibratile movements. To detect these bodies in urine, this secretion should be allowed to repose in a conical glass, the lower part of the sediment being afterwards removed to a glass slide with a pipette. When the seminal fluid is abundant it will possibly render the urine slightly albuminous. In spermatorrhœa there may be simply a repeated escape of seminal fluid; or this is found associated with morbid changes in the vesiculæ seminales, ejaculatory ducts, bulbous portion of the urethra, and prostate gland. The coexistence of the latter occurs more frequently where the disease is due to gonorrhœa, than where it has its origin in self-abuse. The mere occasional presence of spermatozoa in the urine, is of course of no consequence. But in the cases under consideration there are repeated escapes of semen, often by day as well as by night; while the passage of the urine, or the straining to empty the rectum may produce a flow. Where this occurs, the secretion often consists of an imperfectly elaborated fluid,—one loaded with epithelial débris, and defective in true spermatic elements.

The shameless miscreants who are allowed to distribute indecent tracts, and in other ways to spread their nets for victims, always pretend to make a microscopic examination of the urine. They then direct the sufferer's attention to the great number of spermatozoa to be seen. Of course, considerable alarm is experienced as a multitude of lively animalculæ are seen twisting about in all directions. This alarm would be of short duration, however, were it but known that the interesting specimen merely consists of a little sour paste containing the common vinegar eel (*An-*

guillula aceti); whose filiform body, rather more than half a line in length, is the innocent cause of much gross lying and thieving.

The *consequences* of spermatorrhœa are general weakness, with nervous irritability. There is mental depression; as well as a desire for a dreamy kind of existence, rather than a wish to follow any active occupation. The digestive organs frequently get disordered, as is indicated by flatulence and constipation; the sense of hearing, and not uncommonly of sight, becomes dulled; there is loss of memory, and an inability to fix the attention; while attacks of palpitation, giddiness, shortness of breath, headache, and neuralgia are far from uncommon. In extreme instances I believe the final result may be epilepsy, phthisis, insanity, or impotence. That these views are not imaginary I could prove by the recital of cases which have fallen under my observation.

As typical of a class of cases, which are of comparatively frequent occurrence, I would give such a sketch as this:—A young man, about 25 years of age, has never had sexual intercourse, but he confesses to have occasionally practised masturbation since he was thirteen or fourteen years of age. His penis is normal: both testicles are of a proper size, they feel healthy, and they are situated in the scrotum. He enters into a matrimonial engagement; but unfortunately a period of eighteen months or two years must elapse before he can fulfil his contract. During this interval he sees his future wife daily, and in spite of his resolve not to encourage any feeling of excitement yet repeatedly he suffers from seminal emissions. At the time of marriage he is nervous, weak, and has fits of mental depression; while his wedding trip is rendered perfectly miserable on finding that immediately he attempts to have connexion an emission takes place and the erection ceases. Night after night his efforts prove unavailing; until at the end of two or three weeks he becomes thoroughly ashamed of himself, afraid of his wife's female relations, and terribly depressed. It is cruel and absurd to tell an individual suffering from such symptoms that he has nothing the matter with him; that he is hypochondriacal; and that such a disease as spermatorrhœa has no existence. To do so is merely to send him to some rogue who will draw a terrible picture of the result of his weakness, and rob him to the utmost possible extent. The truth is that the patient has not the power he needs; and this power can only be given to him by well-directed medical treatment.

The *treatment* of spermatorrhœa is not to be regarded as a subject beneath our consideration. At the commencement, it is necessary to obtain the confidence of the patient; so that while we calm his excessive anxiety, we may also impress him with a belief in our power to effect a cure if he will but carry out the directions which are given. He ought to be urged to read no books on the subject of his disorder, to work earnestly but not immoderately at his occupation, to seek cheerful society in the evening, to take a proper amount of exercise, to sleep upon a mattress and not to remain in bed for more than eight hours, not to indulge in heavy meals, and (as a rule) to avoid smoking and the use of alcoholic drinks. Supposing the emissions take place when he lies upon his back, as they often do, he should tie a cotton reel over the middle of the spine, so that he may awake directly he assumes this unfavourable position. The bowels must be regulated by the exhibition of simple aperients (F. 165, 169, 194), provided attention to the diet and the use of ripe fruits fail to procure an easy evacuation every day. If there are prominent symptoms of nervous depression, a mixture of phosphoric acid, tincture of nux vomica, and bark (F. 376) will prove very serviceable; or a pill of sulphate of zinc and extract of nux vomica (F. 409) may be ordered. When the patient is unmarried I generally avoid giving steel in any form; inasmuch as this medicine often produces congestion of the sexual organs, and so keeps up the irritation which it is our object to subdue; though sometimes, in cases where there is real and continuous loss of semen, very large doses, half a drachm or a drachm of the tincture three times a day may bring about a speedy cure. Where the man is married, and is unable to have intercourse, a mixture of quinine and iron (F. 380) will be unobjectionable. A tepid salt water sponge bath had better be taken every morning; while the glans penis is to be washed so as to remove the secretions of the sebaceous glands. The use of a suspensory bandage is often beneficial. Where the emissions are not very frequent, this plan of treatment will suffice; but in the more severe forms of spermatorrhœa we may have to prescribe, in addition, cod liver oil, a moderate allowance of wine or bitter ale, the use of milk instead of tea or coffee, and to recommend a holiday with residence at the seaside. If any sedative be needed, a pill containing camphor with small doses of conium and belladonna (F. 326) will often exert a favourable influence. And then, if there be any disease about the rectum, or if there be indications of the presence of oxyurides, or if there be irritability of the bladder, or if the urine be excessively acid, the necessary steps for effecting a cure of these affections must be taken.

With regard to local treatment I can only say that I believe the instances in which it is called for are very exceptional. At the same time, I have seen cases where a good effect seems to have been produced by the introduction of a metallic sound into the bladder once or twice a week. The application of nitrate of silver to the prostatic portion of the urethra, by means of Lallemand's porte caustique, has been highly spoken of by gentlemen of great experience; but if it be used the patient ought to remain quiet for a day or two after the application, he should be kept on a milk diet, and he must be told that it will give rise to considerable irritation with the passage of bloody urine. Where there is extreme relaxation, galvanism deserves a fair trial. And lastly, it must be remembered, that when a cure has been effected, moderate sexual intercourse tends to maintain the general health; although, if the practitioner feels it his duty to recommend marriage, he should give a warning as to the mischief which will inevitably result from "a long engagement."

PART XIII.

DISEASES OF THE FEMALE ORGANS OF GENERATION.

I. DISEASES OF THE VULVA.

THE parts included under the term "vulva" [probably as if *Valva*, pl. *valvæ* = folding doors] consist of the external organs of generation,—the mons Veneris, the labia majora, the labia minora or nymphæ, the clitoris, the vestibule, the meatus urinarius, the orifice of the vagina, and the hymen stretching across the lower portion of this orifice in the virgin. The diseases of these structures are of considerable importance. They can seldom be correctly diagnosed without an ocular inspection; for making which it generally suffices to place the patient upon her left side, in the ordinary position for labour. Some practitioners prefer to have the woman upon her back, with the knees drawn up; but as an examination so conducted is revolting to a woman's feelings, it should only be resorted to in exceptional cases.

1. VULVAL PRURITIS.

Pruritus [*Prurio* = to itch] of the vulva may be only a symptom of some disease, or it will now and then occur as the sole local affection. This very troublesome disorder consists of a perverted sensibility of the nerves of the district. Like some other neurotic affections it is much more frequently met with in old age than in the earlier periods of life. I am inclined to think that it is more common in married women, than in those who have never had intercourse; although the soundness of this opinion cannot be demonstrated by a reference to numbers.

Causes.—When pruritis occurs as an idiopathic disorder it will frequently be found that the general health is far from good. The patient is pallid, complains of debility and lowness of spirits, and perhaps has been losing flesh. The appetite is bad; while the digestive organs act imperfectly, there is acidity with flatulence, the liver is torpid, and the bowels are apt to be confined.

Not uncommonly, the irritation is merely the symptom of some uterine disease; especially of displacement, or of excoriation around the os uteri, or of the early stage of carcinoma. A vascular tumour at the orifice of the urethra will give rise to almost intolerable attacks of itching about the vulva; and so sometimes will leucorrhœa in whatever way it is set up, or chronic inflammatory affections of the vagina, and a dilated condition of the veins of the labia. Hæmorrhoids not unfrequently produce it. In the early stages of pregnancy it may prove very annoying; oft-times the irritation continuing until after labour, and even until the complete cessation of the lochia. The commencement of each menstrual period, in many sensitive women, is attended with itching about the pudenda, especially if the flow be scanty. Finally, irritation is not a very uncommon symptom at the climacteric period, when the catamenia appear irregularly before their final cessation.

An examination of the stools and of the urine had better be made in all obstinate cases of pruritus: of the former, so as to be sure that there are no thread worms keeping up the irritation; of the latter—lest there be any sugar present. I can scarcely believe that there is any connexion between diabetes and pruritus, but every now and then the two are found to be coexistent.

Symptoms.—The sensation experienced is not always that of intense itching. Sometimes it is described as a tingling or smarting, with a feeling of heat about the parts; these symptoms being aggravated by spiced or heating food, and especially by alcoholic drinks. In other instances it is spoken of as a sense of creeping or formication, so that the patient will hardly believe that the parts are not infested with a number of disgusting insects. The irritation is so insupportable at times that the patient cannot refrain from scratching herself. Hence the vaginal labia, as well as the tissues about the perineum and vestibule and mons Veneris, get red and excoriated; small scabs forming and increasing the evil. With other cases the parts are dry and angry-looking, while there are marks of the scratching produced by the nails. The long persistence of the pruritus likewise leads to actual alterations in the cutaneous tissues. On making an examination of the vulva, as well as on opening the vaginal labia, these parts are seen to be of a peculiar silvery colour; often looking as if they were coated with a white metallic paint, which had not dried. The leucorrhœal discharge which is usually present aggravates the irritation, especially if this discharge be at all acrid; while it may also produce more or less swelling. Occasionally, pruritus appears to be a cause of erotic sensations—perhaps amounting to nymphomania.

Under all circumstances the irritation is much increased by warmth. Hence, the patient is unable to sit near a fire; but especially is she tormented at night, so that even in winter she may be obliged to have no covering beyond a sheet, or else to keep cold applications constantly over the parts. The want of rest, the loss of appetite, and the almost constant annoyance greatly depress the general powers; while the desire to resort to friction, though it affords only temporary relief at the cost of aggravated suffering afterwards, is so great that the sufferer cannot bear to be long in the company of even her own family.

Diagnosis.—The itching of prurigo may be mistaken for that of pruritus. But the former disorder is more rarely met with than the latter; while the papular eruption of prurigo, seldom confined to the genital organs, is very characteristic. The irritation produced by lice, as well as that caused by the itch animalcule, closely resembles that of pruritus; and therefore we ought to make certain that these insects are not the source of the annoyance. In follicular inflammation of the vagina a sense of smarting, rather than of itching, is complained of; though the latter, as will presently be shown, may also prove troublesome. Chronic eczema of the vulva is attended with distressing irritation, which the patient vainly attempts to relieve by scratching off the dry scales of epidermis, or by the free use of some unctuous substance. Herpetic eruptions also produce itching, but it is seldom of long duration, and is confined to the neighbourhood of the rash. And lastly, crops of small boils are apt to appear upon the outer surface of the large vaginal labia, especially about the time of the change of life; at first producing considerable itching and smarting and heat, with subsequently swelling and pain as the little tumours slowly suppurate.

Treatment.—The remedies which have been proposed for this neurosis of the skin of the vulva are numerous and unsatisfactory. For what is called idiopathic pruritus, the treatment must be general and local; that is to say, attention will require to be paid to the general health, while the local suffering is to be relieved. Now as regards general remedies it will often be found that mild aperients are needed; such as the sulphate of soda with sulphur (F. 148), or sulphur and magnesia (F. 153), or rhubarb and blue pill (F. 171), or if steel be unobjectionable it may be given with Glauber's salts (F. 180, 181). The assimilation of food is to be assisted by the use of pepsine (F. 420), by small doses of steel with citrate of potash (F. 403), or by the nitro-hydrochloric acid in some bitter infusion (F. 378). The diet is to consist of milk, eggs, and animal food plainly cooked; while as a rule, alcoholic drinks, tea and coffee, with all highly seasoned dishes should be avoided. With regard to any special drugs little can be said that is favourable. Yet occasionally it has seemed to me that quinine (F. 379) has been useful, or a pill of quinine and belladonna (F. 44), or tar capsules (F. 36), or the solution of perchloride of mercury in sarsaparilla (F. 27); while sometimes small doses of arsenic (F. 52) have acted beneficially.—The best local applications are those of a cooling or of an anodyne nature. An excellent cold lotion and injection can be made with half an ounce of the solution of subacetate of lead to a pint of water, to which an ounce of laudanum or Batley's solution may be added in some cases, or with one fluid drachm of the solution of sulphate of atropia to one pint of elder-flower water. Painting the parts, twice or thrice daily, with a mixture of equal parts of the aconite and belladonna liniments, often affords considerable relief; as does the frequent application of a lotion containing the acetate of lead and hydrocyanic acid (F. 263), or of morphia and liquor potassæ (F. 266), or of borax and morphia and glycerine (F. 268), or especially of a weak infusion of tobacco (F. 265). Some practitioners use almond oil, or the lime liniment, or a mixture of one part of glycerine to eight of rose water, or the officinal calomel ointment, or a combination of equal parts of the red oxide of mercury ointment and cod liver oil. But whatever remedy be employed, free ablution will also be necessary; which can be best practised by daily using the ordinary hip-bath, or by employing the sitz bath two or three times a day. Whichever be adopted, the patient will derive ease from injecting plenty of the water into the vagina with a syphon syringe.

For the relief of secondary pruritus it is necessary that the cause be removed, when this is possible. The cure of an excoriated patch upon the lips of the uterus will take away the irritation; and the latter may even be thoroughly relieved by proper remedies applied to the former before the surface heals. In such incurable affections as carcinoma of the cervix we may still succeed in checking the itching by the use of medicated pessaries, particularly of such as contain belladonna (F. 423). Supposing the patient to be gouty or rheumatic, the remedies necessary for these states are indicated; especially mild antacid aperients with colchicum, and a diet in which meat is chiefly replaced by white fish. And then again, if there be eczema, lice, oxyurides in the rectum, hæmorrhoids, boils, &c., the treatment proper for these affections will have to be adopted. With regard to the treatment of the crops of boils which have already been spoken of, there are one or two useful hints to be given. One suggestion is to avoid the use of poultices unless the little tumours be actually suppurating. The formation of pus may, however, often be prevented, by just touching the apex of each elevation with a small drop of the acid solution of nitrate of mercury. I generally find that this caustic is best applied by means of a fine-pointed pipette, such as is made for taking up urinary deposits for microscopic examination; removing any surplus acid from the boil with blotting paper. Another important point is, that if we would prevent the formation of further crops the general health must be attended to.

2. LABIAL TUMOURS.

Several varieties of tumours may be met with on or about the vaginal labia. The principal are the following:—

Encysted tumours of the labia either have their origin in the connective tissue; or they may arise in one of the lobules of the vulvo-vaginal gland, the communication of which with the excretory ducts has become obstructed; or the entire gland of one or the other side may be involved, owing to obliteration of its duct. The cyst is generally developed slowly, and at first hardly attracts the patient's attention; but as the growth attains the size of a walnut there is discomfort on walking, uneasiness after sexual intercourse, sometimes irritability of the bladder, and occasionally pain. The latter is especially complained of about the time of the catamenial periods. If inflammation set in, the cyst walls will generally secrete pus and the tumour become an encysted abscess. The cause of these tumours can seldom be made out; but I believe they may result from violence, or from the irritation set up by a want of cleanliness. The contents of the cyst will be of the nature of a glairy white of egg-like fluid, or of an offensive dark-coloured matter, or of pus. The evacuation of the contents by a simple incision through the inner wall of the labium gives immediate relief; but generally such an operation is insufficient to effect a permanent cure. To insure this, either a portion of the cyst-wall must be excised, a proceeding, however, which is not always successful; or the interior of the cyst should be rubbed over with a stick of nitrate of silver, or with a brush dipped in the iodine liniment; or a seton can be passed through the centre of the swelling, so as to excite suppuration and obliteration of the secreting membrane; or the entire cyst may be dissected out, without puncturing it. As this latter proceeding is the most certain, so it is often by far the best plan to adopt.

Fibrous tumours are occasionally developed in one of the labia majora, or more rarely about the perineum. They may vary in size from that of a hazel nut to that of an orange. Sometimes they are found to contain cysts in their centres; which are filled either with sanguineous serum, or with a limpid watery fluid. *Fatty* tumours are also now and then met with in the same situations. The growth of both these kinds of tumour is usually slow, and is not accompanied by any marked symptoms. Not uncommonly they gradually become pedunculated; so that a tumour almost as large as a fowl's egg may be connected with one of the labia by a stalk no bigger than an ordinary quill. Frictions with ointments of mercury or iodine are quite powerless to produce the absorption of these bodies. The only remedy is excision, a very simple proceeding when the attachment is formed by a pedicle. But even where the tumour is imbedded in the tissue of the lip, there is seldom any difficulty in enucleating it with the handle of the scalpel, after making a free incision through the internal surface.

Warty growths are apt to form about the vulva, sometimes appearing in such large clusters as apparently to involve the whole of the external genitals. Usually, however, they are scattered about the labia, nymphæ, vestibule, and perineum; varying much in size and appearance, according as there are only a few little warts distributed over the tissues, or one or more large patches almost concealing the vaginal orifice. These excrescences are sometimes very vascular, so that they bleed readily; while each is found growing from a broad base, or by a pedicle which sometimes gets greatly elongated. Warty growths always give rise to a fetid discharge, with vaginal leucorrhœa; and they may be due to some venereal taint, or simply to want of cleanliness. The only effectual treatment consists of removal with the scissors or bistoury, applying some styptic to control the hæmorrhage. The application of escharotics without excision is seldom successful; while the pain set up by these substances continues for a very much longer time than does that produced by the use of the knife.

Hypertrophy of the labia may occur, and sometimes to an enormous extent. The skin and connective tissue of the labia majora are now and then alone affected; though more frequent the nymphæ become also involved. The enlargement usually commences on one side, but probably before advice is sought it has crept round so that both lips are attacked. In very rare instances (in this country) the hypertrophy has advanced to such a degree as to constitute a form of elephantiasis. An instance has been recorded by Kiwisch, in which a girl, seventeen years of age, had such hypertrophy of both labia, that they hung down as two large masses below the middle of the thighs. Elephantiasis of the labia is not an uncommon disease in Barbadoes. In the cases of hypertrophy which have come under my notice, the enlargement has been due to a syphilitic taint. The treatment of such cases is generally unsatisfactory. Sometimes their progress can be checked by the administration of the red iodide of mercury (F. 54), together with the use of the mercurial vapour bath (F. 131). But generally it is necessary to remove the growths with the knife; although a permanent cure is seldom produced by this operation, inasmuch as it is difficult to make the incisions quite free from the diseased structure. Excision is always attended with considerable hæmorrhage; so that not only will several vessels require the ligature, but the actual cautery may have to be applied to spots from which blood will otherwise freely ooze when reaction occurs after the operation. Where it is clear that all the disease cannot be removed by the knife, it will be better to restrict the treatment to the use of astringent lotions, and the occasional employment of scarifications to relieve the œdema.

Abscess of the labia may result from the inflammation set up by a blow, or by forcible or perhaps excessive sexual intercourse, or by a gonorrhœal or acrid leucorrhœal discharge. The part affected becomes the seat of a throbbing pain, which prevents the patient from walking or sitting without much suffering; while there is also considerable heat and swelling, sensitiveness on the least pressure, together with a variable amount of constitutional disturbance. Sometimes the inflammation commences in the vulvo-vaginal gland, the tissues of the labium becoming involved as the morbid action progresses to suppuration. With moderate caution there can be no difficulty in making the diagnosis sure. The descent of omentum or intestine into the labium, a displacement of one ovary or an extravasation of blood, are all conditions which give rise to swelling and pain; though both these consequences are different from the tumefaction and suffering of inflammation. Patients seldom apply for relief, moreover, until there is no difficulty in diagnosing the presence of pus. The treatment consists in evacuating the pus by an incision sufficiently free to prevent its too early closure. The application of poultices, a nourishing diet, and two or three days' rest, will complete the cure. Where the practitioner is consulted before suppuration has occurred, the disease can at times be checked by rest in bed, the application of a small bladder or gutta-percha bag of ice, and attention to the general health. Aperients are only to be given, if required; while if there be any debility, ammonia and bark (F. 371), cod liver oil, and animal food will prove very useful.

The extravasation of blood into the connective tissue of one of the labia majora, or of the nymphæ, or of the vaginal walls, is an accident of very uncommon occurrence. It happens for the most part, just before, or during, or immediately after the process of parturition. The swelling which results is known as a *pudendal hæmatocele*, or a *labial thrombus*, or a *sanguineous tumour of the vulva*. The hæmorrhage is the consequence of a rupture of part of that plexus of veins beneath the labia, termed by Kobelt the bulbi vestibuli. The bleeding may be very copious, even without a large rupture: fatal results are not unknown.

As far as can be remembered, I have never met with an example of pudendal hæmatocele as the consequence of disease in an unimpregnated woman; but two or three cases have fallen under my observation where this condition has happened as the result of a blow. In one of these, a young single girl fell upon the projecting corner of the upper rail of a kitchen chair, upon which she had climbed to reach the top of a wardrobe. The other patient was a married woman, but not pregnant: the hæmatocele resulted from a kick. In both instances, the pain was so great that I punctured the tumours, let out a quantity of blood, and then by rest with the pressure of pads and a T-bandage prevented any further hæmorrhage. Where these tumours are left untouched they not uncommonly burst; although where the clot is not very large it may become absorbed. With regard to the treatment of this accident during labour it need only be said that delivery should be hastened; but the tumour ought not to be opened unless from its size the passage of the child be impeded. Supposing, however, the bistoury be used, the officinal strong solution of perchloride of iron will probably have to be applied to control the bleeding which is sure to ensue from the injury to the bulbs of the vestibule. If there be any varicose condition of the veins, the loss of blood may prove quite alarming unless firm pressure be made for some time.

3. VULVITIS.

The different forms of inflammation which may attack the vulva are as follows:—

Simple vulvitis is not a very uncommon affection of women who neglect to wash themselves, or who indulge in excessive sexual intercourse. It may also arise from a venereal taint, or from irritation about some adjacent organ—as the rectum or uterus. The symptoms consist of great pain and tenderness, a mucous discharge, a sense of scalding during micturition, and of a constant aching about the loins and thighs. The parts look swollen and inflamed, and they are covered with mucus; while in neglected cases they may be found more or less excoriated. A few doses of a saline aperient, rest in bed, prolonged warm hip baths, and the use of a wash containing a little alum or subacetate of lead, will soon remove the disorder.

Under certain exceptional circumstances, inflammation of a much more intense and serious nature occurs. *Gangrene of the vulva* is connected with a depraved state of the blood; being met with amongst lying-in women who have possibly been exposed to the contagious matter of puerperal peritonitis, or of one of the continued or eruptive fevers. Now and then this disease happens amongst young women who are not pregnant; while it has especially been observed in children. The only hope for all such patients lies in the administration of wine and food, quinine and iron, and in surrounding them with pure air. Locally, the strong nitric or hydrochloric acid should be applied to the diseased patches; the patient being first placed under the influence of some anæsthetic. M. Chavanne has given an account* of an epidemic of gangrenous vulvitis which attacked several puerperal women during January, 1850, in La Charité of Lyons. The disease commenced three or four days after delivery with vomiting and diarrhœa, or with fever and abdominal pains, or with slight hæmorrhage. These symptoms were followed by prostration, anxiety, and an œdematous redness of the vulva. An active febrile stage then set in; which, in a few of the twenty-six cases, subsided without further mischief. In the greater number, however, pultaceous plates formed about the vulva and on the walls of the vagina, adhering closely to the mucous membrane. Although this extension became arrested in a day or two, these plates were not separated by the inflammatory process until the end of the first week, or during the second; small suppurating wounds being left, which usually soon healed, though occasionally they again became covered with a similar pultaceous mass. In four of the twenty-six cases, the disease extended to the uterus; a gangrenous condition of this organ, complicated with peritonitis, setting in. Three of the other patients also died from metro-peritonitis, without extension of the gangrene. The remaining nineteen recovered; the gangrene yielding to tonic regimen, and the local use of the strong hydrochloric acid. No cause could be assigned for the outbreak of this epidemic; which seemed to resemble one that had occurred a short time previously in Paris, as well as one which was observed at Lyons in 1815.

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* *Gazette Médicale de Paris* for 1852. Quoted from the *Association Medical Journal*, p. 216. 11th March, 1853.

Inflammation of the vulvo-vaginal glands is not of very rare occurrence. These conglomerate glands, the analogues of Cowper's glands in the male, are placed one on each side of the vaginal orifice. They are apt to become inflamed from their secretions being retained in consequence of the excretory ducts getting blocked up. The symptoms consist of heat and pain; while on examination a painful swelling is found, perhaps of the size of a large almond, by the side of the mouth of the vagina. Unless resolution occurs, the morbid action will end in suppuration; and then the case must be treated as if it were a common abscess. In simple enlargement and induration of this gland, from long-continued irritation, extirpation may possibly be needed.

Follicular inflammation of the vulva is an obstinate and painful disease, which has been well described by Dr. Oldham.* The morbid action has its seat in the numerous sebaceous follicles and other minute solitary glands scattered over the mucous membrane of the vulva; and it generally affects both sides of the vaginal entrance, with the tissues within the nymphæ and at the base of the clitoris. According to M. Huguier, the sebaceous matter sometimes accumulates in these follicles, without inducing inflammation; a condition resulting analogous to that observed in acne of the face. On making an examination in a case of follicular vulvitis, the parts are found more or less generally inflamed; while they are seen to be studded with a number of raised vascular points, sometimes having specks of ulceration on their summits. After a time the points coalesce, so that a strip of highly injected mucous membrane is formed; while at a later period this vascularity disappears, and the tissues look as if they were covered with white paint. There is constriction of the sphincter vaginæ; leucorrhœa is troublesome, with irritation of the genitals and smarting; sexual intercourse becomes so painful that it has to be avoided; and there are pains in the back and thighs. The heat and irritation about the vulva, the sense of burning during micturition, and the somewhat offensive nature of the secretions may all prove very troublesome. The disease causes considerable disturbance of the general health, with loss of appetite and mental depression. It is sometimes complicated with prurigo. This disorder may occur at any time after puberty; though perhaps it is most common during pregnancy, as well as about the time of the cessation of the catamenia.

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* *London Medical Gazette.* New Series, vol. ii. p. 845. 15th May, 1846.

Follicular vulvitis is of a very intractable nature, and is not easy to treat. The application of astringents always proves injurious; inasmuch as these agents produce very great pain at the time they are used, while they set up an increased tenderness of the parts which may last for many weeks. The best local remedies are those which exert a soothing influence; and no lotions are therefore more valuable than such as contain morphia and hydrocyanic acid (F. 266), or tobacco (F. 265), or glycerine and lime water (F. 286). If ointments be preferred, one of iodide of lead and belladonna (F. 293), or of aconitine and calomel (F. 296), or of hydrocyanic acid and atropia (F. 306) may be prescribed. A warm hip-bath, containing some extract of poppies and soda, will afford considerable relief: it should be employed night and morning, for fifteen or twenty minutes each time. The general health must be looked to. The diet ought to be plain, nourishing, and free from seasoned dishes. Tea, coffee, wine, and beer are to be forbidden; a little brandy in soda water being allowed where a stimulant is required, though this may often be dispensed with if the patient can take plenty of milk. Small doses of arsenic with bark (F. 52) have sometimes seemed efficacious; so has some bitter tincture with the mineral acids (F. 378); and so has quinine with aconite (F. 379). In very chronic cases, a cure will now and then be effected by corrosive sublimate and sarsaparilla (F. 27), cod liver oil, and change of air.

The external surfaces of the labia majora sometimes become the seat of *erythema*, generally in consequence of a neglect of cleanliness. The eruption is of a bright red colour, and gives rise to a sensation of heat and discomfort; while it soon spreads along the integuments to the upper and inner surfaces of the thighs. This disease is most common in stout middle-aged women; and, unless they abandon their dirty habits, the moisture which is exhaled from the almost raw surface becomes very offensive. Indeed, if the discharge be allowed to irritate the parts for any length of time, *erysipelas* will possibly set in; a disease which may also attack the vulva from other causes, and which requires the same treatment as when it affects other tissues. In erythema, a cure can generally be brought about by removing any disordered state of the health, by ordering an unstimulating diet, and by having the affected parts well bathed every few hours with the dilute solution of subacetate of lead. Women are fond of applying Fuller's earth (consisting of silica, alumina, oxide of iron, magnesia, and water, with traces of lime and chloride of sodium and potash) to the irritable surface; and as this substance is astringent it can do no harm, provided the parts are also often washed. The remedies for *prurigo, lichen, eczema,* and *acne* of the vulva are the same as for these diseases affecting other structures.

Children of all ages are liable to become affected with a discharge from the mucous glands of the vulva, constituting *infantile leucorrhœa.* Occasionally the disease spreads up the vaginal canal; giving rise to a profuse purulent or muco-purulent fetid secretion with heat and pain during micturition, and slight excoriation of the surrounding parts. The practitioner must be on his guard lest he compromise some innocent individual by attributing the discharge to gonorrhœal infection, or to violence in attempting a rape. A few years ago, I saw in consultation with Dr. S. C. Reed and Mr. Brooks of Fleet Street, a strumous little girl, seven or eight years of age, with an abundant leucorrhœal discharge. There were no marks of contusion or violence about the pudenda, and the symptoms seemed clearly due to natural causes. The parents, however, had made up their minds that a young man who lodged in the same house, had been trying to have intercourse with the girl; and I believe they had given him into custody on this supposition, and were to proceed to the police court from my house. It required considerable persuasion to make the parents understand that there were no grounds whatever for their suspicions. Dr. Taylor* has collected the histories of several cases where men have narrowly escaped conviction for crimes which were never committed. This gentleman shows that a purulent discharge with aphthous ulceration may take place as a result of vaginitis; the inflammation occurring in scrofulous children, or in others as the result of dentition, intestinal worms, a want of cleanliness, &c. Children thus affected have been taught to extort money, by making imputations against innocent persons; or the parents have now and then unwittingly led a mischievous girl to make such a charge, by first threatening and then suggesting their own convictions to her. With regard to those fatal sloughing or gangrenous ulcerations of the vulva described by Mr. Kinder Wood* I can say nothing from my own experience. They must be very rare in this metropolis; for with all the opportunities formerly afforded by a large hospital and dispensary practice I have never met with one example. No medical man, however, should venture to give evidence at a trial for rape upon a child, without making himself acquainted with Mr. Wood's paper; for the prisoner's counsel will very properly have "got up" all its details, and he may soon make the practitioner look rather foolish.

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* *Medical Jurisprudence.* Seventh Edition, p. 692, et seq. London, 1861. Dr. Guy (*Principles of Forensic Medicine.* Second Edition, p. 38. London, 1861) also shows very clearly how appearances on the parts of generation, resembling those due to violence, may be caused by disease.

The symptoms of infantile leucorrhœa consist of itching and of tenderness, as well as of frequent micturition with oft-times pain on passing water. There is a mucous discharge, which becomes more copious and acrid the longer it is allowed to continue. Not uncommonly, the parts about the vulva have an erythematous blush. The irritation produced by this eruption, as well as by the discharge, causes the child to frequently rub or scratch herself; and thus troublesome excoriations are produced and kept up. In rare cases an ulcer may be found just within the vagina. The general health is depressed; the nights are restless; and often some of the cervical glands are swollen, or there are other marks of the strumous constitution. The child is either badly fed, or does not properly assimilate its food. In that form of inflammation which is described as *diphtheritic vulvitis,* tough false membranes are formed upon the inner surface of the labia; such membranes being reproduced after forcible removal. These exudations resemble those thrown out about the fauces in true diphtheria. The effects of the diphtheritic poison are very rarely, if ever, confined to the vulva in these cases. Somewhat analogous to them are those instances of scarlatinal vaginitis which have been already referred to.

The treatment of infantile leucorrhœa must be perseveringly carried out, or the disease will last for many weeks. Attention to cleanliness, frequent sponging or syringing with an astringent lotion, the use of tepid hip baths containing a little alum, and the occasional exhibition of mild alteratives or laxatives will be needed. Where there is much tenderness, the parts ought to be fomented with a decoction of poppies for two or three days before using the astringent applications. The diet should be plain but nourishing, with plenty of milk; and tonics (especially quinine and steel) will always be useful. Cod liver oil is often very serviceable. If the discharge proves obstinate, a short residence at the seaside, with sea bathing, will generally cure it.

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* *Medico-Chirurgical Transactions,* vol. vii. p. 84. London, 1816.

4. RODENT ULCER.

This remarkable disease (often described under the name of *Corroding ulcer*) consists of an intractable ulceration, which commences on some part of the external genitals, and gradually creeps over the vulvo-anal region; the surrounding structures having a tendency to become hypertrophied. As the ulcer heals in one direction, it extends in another; while the process of repair seems to be accompanied by the formation of a firm burn-like cicatrix, which has a great tendency to cause contraction of the vaginal or anal orifice. At the onset, as well as for some weeks afterwards, the suffering may be remarkably slight; so that until the orifice of the vagina becomes fissured by the disease, or the mouth of the urethra gets involved, there is no pain during sexual intercourse or micturition. For a long time the general health does not appear to be affected, menstruation occurs regularly, and there is no loss either of strength or of flesh; but unless a cure be effected the profuse discharge at length proves very weakening, the appetite ultimately fails, there is dyspepsia, attacks of colliquative diarrhœa set in, and sometimes there is hæmorrhage. The patient may die either from peritonitis, or from erysipelas, or from stricture of the rectum, or from fatal exhaustion. Death, however, seldom takes place until after the lapse of some eight or ten years from the commencement of the disease.

This affection has been particularly described by M. Huguier in his *Mémoire sur l'Esthiomène, ou Dartre Rongeante de la Région vulvo-anale*,* in which he draws a parallel between the eruptions of the face and those of the vulvo-anal region. The ulceration occurs for the most part in women between the ages of 20 and 50, who are either married or have led irregular lives. Nothing positive is known as to its cause, though it has seemed to depend upon some strumous condition of the system, or upon a degenerated syphilitic virus affecting the fluids. M. Huguier treats of the disease as it occurs in three stages:—(1) The *superficial, creeping or serpiginous* form, of which there are two varieties—the *erythematous* and the *tubercular esthiomenos* ['Εσθίω = to corrode or eat away]. (2) The *perforating*, which slowly and steadily advances until the ulceration produces the most frightful ravages. And (3) the *hypertrophic*, in which, as one portion of the affected tissue is being destroyed, another part is undergoing abnormal development. Of this kind there are also two varieties:—The *vegetating hypertrophic*, where small vegetations or excrescences appear upon the ulcerated surface or on the surrounding indurated integument. The other form of hypertrophic esthiomenos is the *œdematous* or *elephantiasic* kind; in which inflammation of the lymphatics, with venous obstruction, leads to excessive infiltration and induration of the tissues, large masses being produced that obstruct the vaginal and anal outlets at the same time that they give rise to the most repulsive disfigurement.

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* *Mémoires de l'Académie Nationale de Médecine*, tome xiv. pp. 501—596. Paris, 1849.

The general treatment of vulvar corroding ulcer or esthiomenos is the same as that required in rodent ulcer of the face; though there is more difficulty in effecting a cure, because of the irritation which is kept up by the acrid discharges. Good diet, cod liver oil, rest, daily hip baths, and anodyne lotions are to be employed perseveringly; while sometimes benefit may be expected from the administration of iodide of potassium (F. 31), the green or the red iodide of mercury (F. 53, 54), or from Donovan's triple solution (F. 51). The efficacy of potential caustics is very doubtful. But where the disease is limited, so that the whole of it can be removed, excision should be practised; the operator taking care to extirpate every tubercular excrescence, however insignificant looking, which may be present. As the parts heal, tents or bougies must repeatedly be employed to prevent undue contraction of the vaginal and anal openings.

5. VULVAL CANCER.

Any portion of the external genitals or of the vaginal walls is apt to become the seat of malignant disease. This may occur primarily; or it is often secondary—*i.e.*, the cancerous infiltration extends to the vulva from the uterus, rectum, &c. Epithelial cancer of the external genital organs is more common than any other variety, but occasionally the affection is of the scirrhous or of the medullary form. The latter, however, is very rare, only one example having fallen under my observation. In this case, a married lady, 59 years of age, the mother of six children, suffered from medullary cancer confined to the vagina and external labia; and when I saw her in July, 1861, in consultation with Dr. Ellison, of Windsor, she was dying from exhaustion, the disease having only existed for fourteen months.

The diagnosis of cancer of the vagina is easily made. I have, however, seen a case of large vesico-vaginal fistula, the result of a lingering labour, mistaken for malignant disease. The symptoms of both conditions have some points in common,—great suffering, swelling of vaginal labia, constant escape of urine, and extensive excoriations producing great tenderness. On the other hand, vaginal cancer proves fatal within two years from its commencement; whereas a fistula embitters life without shortening it. In the case just alluded to, thirty-seven years have elapsed since the whole floor of the bladder sloughed away, after (as I am told) a labour lasting for nearly a week. The patient is still able to work for her living, though she suffers much from excoriations, &c.

Epithelial cancer is more amenable to treatment than the other kinds. Where the disease is confined to the external labia considerable relief may be given by excision, provided care be taken to remove every trace of unhealthy tissue. By such an operation, a patient may have one or two or even more years of comparative health and happiness granted to her; though in the end the affection will return, and ultimately destroy life. In those cases where surgical interference is out of the question, attempts must be made to give relief according to the principles already inculcated. The disease often quickly extends in all directions, in spite of remedies; the integuments over the pubes, or in one or both groins, becoming the seat of ragged excavated ulcerations. Frequently, too, the patient's sufferings are considerably increased by the destruction of the recto-vaginal septum, or by the perforation of the walls of the bladder; or we may have to draw off the contents of the bladder every few hours, owing to the almost complete obliteration of the orifice of the urethra. The difficulty of passing the catheter is often so great in these cases, and the pain is so intense, that it is necessary to put the poor woman under the influence of ether or chloroform before using the instrument.

6. ENLARGEMENT OF THE CLITORIS.

Excessive development of the clitoris will occasionally exist as a congenital malformation; although it seldom does so, save in connexion with some arrest of development about the uterus, vagina, or labia. This organ may also acquire an abnormal size in after life; either owing to simple hypertrophy of its tissues, or to its becoming the seat of an innocent or malignant deposit, or to its giving origin to some cystic formation.

A very remarkable case in which the clitoris was converted into a cyst, has been recorded by Dr. Meigs.* The tumour commenced after a blow, and in fourteen years acquired the size of an infant's head, to judge from the sketch which is given. It was punctured; about twenty-two ounces of black blood, of the consistence of tar, being evacuated. Four months afterwards, the fluid was again collecting.—The history of a case of enormous enlargement of the clitoris and nymphæ, has been published by Dr. M'Clintock.† When the patient was admitted into the Dublin Lying-in Hospital, in the seventh month of her second pregnancy, the nymphæ hung down in the form of tuberculated tumours, with the clitoris between them as large as a turkey's egg. Nine years previously she had suffered from syphilis; but the enlargement had only commenced two years prior to her admission into the hospital. The clitoris was amputated by the ligature, as it was feared that it might interfere with parturition. Some weeks after her labour, the nymphæ were likewise removed by ligatures and the scalpel.—In another instance, related by the same physician, a single lady, 20 years of age, suffered from enlargement of the nymphæ; while the prepuce of the clitoris had become the size of a Spanish chesnut. Local and general treatment proving useless, the diseased parts were successfully amputated with the écraseur.—The clitoris may be injured by violence. The particulars of an instance in which this organ was ruptured by a kick, have been given by Mr. Gutteridge.* On inspecting the vulva a wound was seen just within the vagina on the left side; the injury extending from the pubes along the ramus of this bone, to the extent of an inch, and having a depth of about three-quarters of an inch. The left crus clitoridis was crushed throughout its length, so as to show its cavernous structure. From this part hæmorrhage had ensued, which proved fatal in about an hour from the receipt of the injury.

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* *A Treatise on the Diseases and Special Hygiène of Females.* By Colombat de l'Isère. Translated from the French by Charles D. Meigs, M.D., &c., p. 85. Philadelphia, 1850.

† *Clinical Memoirs of Diseases of Women,* p. 224. Dublin, 1863.

Hypertrophy of the clitoris has been thought by some surgeons to be due to the practice of improper excitement of this organ. The probability is, however, that this explanation is incorrect. At all events, out of 6000 prostitutes examined by Parent Duchatelet, the clitoris was found to be natural in size and appearance in all but three; and none of these three women were remarkable for the strength of their passions. The clitoris is sometimes found indurated with only slight, if any, enlargement. The late Mr. Baker Brown considered this condition to be due to self-abuse; and he recommended that the clitoris should be excised. Mr. Brown believed that he cured many serious diseases of the nervous system, originating in improper excitation of the sexual organs, by this operation. But the operation was condemned by the general voice of the profession, and in deference to this, Mr. Brown ceased to recommend it.

When, in consequence of hypertrophy or cystic disease, amputation of the clitoris becomes called for, it will be found better, as a rule, to use the knife or scissors in preference to the ligature. The patient ought to be placed in the same position as for lithotomy, after anæsthesia has been induced; and the organ being drawn well forward with a pair of hooked-forceps, it should be excised by cutting through the crura on each side. The free hæmorrhage which results is easily checked by the use of pads of lint and a T-bandage, so applied as to exert sufficient pressure upon the symphysis pubis. An opiate will be needed to dull the pain. The catheter will afterwards be required for two or three days; and the patient must remain in bed until cicatrization is complete.

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* *The Lancet*, p. 478. London, 31st October, 1846.

7. COCCYODYNIA.

The coccyx is formed of four small segments of bone, which may be regarded as rudimentary vertebræ. None of the segments have any spinal canal or intervertebral foramina. The first and largest division of the coccyx articulates with the lowest sacral vertebra: the last three coccygeal segments are usually anchylosed into a single bone.

The coccyx, or the tendinous expansions of the muscles and the fibrous tissue of the ligaments, will now and then be found the seat of severe pain of a neuralgic character; this affection being technically known as *coccyalgia*, or *coccygodynia*, or *coccyodynia* [from Κόκκυξ = the cuckoo—because the coccyx is said to resemble the beak of this bird—and ὀδυνη = pain].

The *causes* of coccyodynia are usually blows, falls (especially tumbles down three or four stairs, when the bottom of the back strikes the edge of each stair), bruises produced by violent or prolonged horse-exercise, injuries inflicted during parturition, and so on. Moreover, whatever is capable of exciting inflammation in the muscular attachments to, and the fibrous tissues around, the coccyx, may lead to this disease. Hence, we find it attributed to sitting on damp grass or cold stones, to the application of ice which has been used for checking uterine hæmorrhage, as well as to mischief set up by unnecessarily severe operations about the rectum.

The *symptoms* are characteristic. They consist chiefly of great pain on sitting down or on rising from a chair; as well as on walking, and on defecation, &c. Indeed, whatever stretches the exceedingly tender structures attached to the coccyx, proves to be the source of considerable suffering. Many of the patients can only sit on one hip. They get from the sitting to the erect posture in a slow and deliberate manner; so as to avoid any strain on the coccygeal ligaments, and to prevent any play of the sacro-coccygeal articulation.

The tenderness on pressure is usually well-marked; while sometimes the slightest touch of the tip of the bone causes agony. The tenderness is also aggravated by sexual intercourse, and frequently by the menstrual flow. Occasionally, coccyodynia is accompanied by some chronic uterine or ovarian disease. Frequently the general health is depressed; while there is also no little anxiety, especially where advice has been had without any relief following.

The *treatment* ought to be prompt. It is merely a waste of time to try the effect of warm baths, sedative applications, opiate plasters, iodine liniments, or small blisters over the seat of pain. India-rubber cushions, to keep off pressure, are useless. Leeches do harm. Even the subcutaneous injection of morphia, or of atropine, will only give temporary relief. The only hope of effecting a radical cure is by operation.

Now the most simple proceeding, but unfortunately the least certain, consists in the subcutaneous division of the muscular fibres and ligaments and fasciæ connected with the coccyx, so as to set the bone at rest. The operation, as suggested by Sir James Simpson, is performed with a tenotomy knife, which must be strong enough to bear manipulation without breaking. The blade of this introduced through the skin over the middle of the bone, is to be deliberately passed all round, and close to its surface and edges, as well as over its tip. The disengagement of the coccyx from the surrounding soft textures thus effected, is usually at once attended with complete relief to the pain. But this apparent cure does not always prove real. Either because the tissues again become adherent to the bone, or in consequence of there being some mischief in the osseous structure itself, the pain returns. Under such circumstances the only plan is to amputate the whole, or simply the last two segments of the bone itself.

The coccyx was first extirpated for the relief of neuralgia by Dr. I. C. Nott, of Mobile, Alabama.* Subsequently, in June, 1859, this operation was had recourse to by Sir James Y. Simpson, after he had failed to effect a cure by the subcutaneous division of the muscles and tendons and ligaments attached to the coccyx.† Following in the steps of these gentlemen, I have removed the coccyx in a few instances with complete success. The operation is in no way difficult; it being merely necessary to make an incision about two inches long over the bone, and then having fairly exposed this structure, to sever the soft attachments all round it, dividing it between its segments with the bone pliers. One or two vessels may need a ligature; and then the edges of the wound are to be brought together by a couple of sutures. With rest and water dressing, union will be found complete in a few days. The relief which is thus afforded is sometimes surprising. The general health improves, and all mental anxiety ceases as the feeling is experienced that a most troublesome source of suffering has been removed.

In close proximity to the tip of the coccyx, and attached to it by a fine pedicle, is a minute body which has been the subject of some discussion. It is found as a roundish body about the size of a small shot, or as four or five or more isolated corpuscles connected by fine vessels. This body, discovered by Professor Luschka, of Tübingen, has been regarded by different observers as a gland; as a kind of heart, to strengthen the circulation in the superjacent skin; as the vestige of an organ, only of use during fœtal life; and as the homologue of some structure in the lower animals. This last theory is held by Dr. W. M. Banks, after a thorough investigation of the subject, to be the only rational explanation; while this gentleman believes with Julius Arnold that the body is a vascular appendage of the middle sacral artery, and not a gland as supposed by Luschka. Dr. Banks says* that this coccygeal body hangs from the very end of the middle sacral artery, and is formed by the union into a glomerulus of from two to six clumps of arterial twigs, with saccular dilatations upon them; the whole being bound into one mass by a sort of capsule of connective tissue, which sends in processes between them. The body has no physiological functions; and nothing is known with regard to its pathology. Perhaps, however, it may act as a starting-point for those cysto-sarcomatous tumours now and then found in the perineum. There is probably no connexion between this arterial appendage and coccyodynia; notwithstanding Luschka's opinion, that this affection consisted essentially of an inflammation of the little coccygeal body.

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* Quoted from the "New Orleans Medical Journal," May, 1844, by the *American Journal of the Medical Sciences*, New Series, vol. viii. p. 544. Philadelphia, 1844.

† *The Medical Times and Gazette*, p. 1. London, 2nd July, 1859.

There are other congenital coccygeal tumours occasionally met with, which on dissection have been found to contain rudimentary bones and muscles and teeth. Such growths have sometimes been formed by the inclusion of one fœtus within another: that is to say,—two ovules having been impregnated, after a time the development of one has become arrested. Either before or just as this has happened, however, the blighted fœtus has become attached to the healthy body; and thus has got included in its structure.†

II. DISEASES OF THE URETHRA.

Diseases of the female urethra are neither very common nor severe. The simple nature of this canal as compared with that of the male, accounts for the great difference which exists between the morbid states of this part in the two sexes; while inasmuch as it is only an inch and a half in length, remedial measures are of easy application. The meatus urinarius, placed just above the orifice of the vagina, is at times found very much dilated, or contracted, or displaced, or simply or specifically inflamed. In a few remarkable instances of vaginal malformation the orifice of the urethra has become so dilated, that sexual intercourse has been effected through it. Strange to say, such a proceeding has not led to incontinence of urine.

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* *The Glasgow Medical Journal*, p. 14. New Series, No. 13. May, 1867.

† Compare with the Author's *Signs and Diseases of Pregnancy*. Second Edition, p. 170. London, 1867.

1. URETHRAL TUMOURS.

The meatus urinarius is not uncommonly the seat of a *vascular tumour*. There may be only a single growth, or two or three: generally they are attached by broad bases, but sometimes they are found pediculated. Although the external orifice of the urethra is their most frequent seat, yet they may grow from any portion of this canal. In some rare instances, similar growths have been found at the orifice of the male urethra.

Each excrescence consists of several hypertrophied papillæ, invested by a thick layer of tesselated epithelium; and while the growth is certainly very vascular, it is also probable that it is freely supplied with nerves. In the cases which have come under my notice, the tumour has varied in size from a florid elevation the size of a pin's head, to a growth as large as a date stone; but instances have been recorded where the tumour has equalled a pigeon's egg in its measurements. Moreover, as far as my experience goes I should say that the larger the tumour, the less severe is the suffering occasioned by it. In examining women rather far advanced in life, the subjects of uterine disease, I have on several occasions found these tumours as large as peas, while no sense even of discomfort has been experienced.

Generally speaking the symptoms resemble those produced by a stone in the bladder. Thus, there is irritability of the bladder, a sanious or slight muco-purulent discharge, great pain on passing urine, and tenderness on pressing the urethra. Sexual intercourse aggravates the suffering, and oft-times cannot be borne at all. In one woman under my care, the bladder was so irritable that there was not merely frequent micturition, but complete incontinence of urine. Now and then there is pain down the inside of the thigh; while I have known severe pain in the heel result from one of these urethral growths. As these tumours are liable to bleed at times, a little blood often comes away with the urine; so that until an examination of the parts be made, the practitioner may be led to imagine that there is either a cancerous substance or a small calculus in the bladder.

These tumours are readily removed, but it is not as easy to prevent their return. The treatment which I have found answer the best consists in excising them with a pair of sharp-pointed scissors, and in then applying the actual cautery so as to destroy the submucous base. An excellent instrument for this purpose may be made by fixing a piece of thick bell-wire into part of the stem of a common clay pipe; the flame of a spirit lamp being sufficient to heat it. The cautery, moreover, not only destroys the base of the growth, but stops the hæmorrhage which follows simple excision. The use of the acid solution of nitrate of mercury, or of potassa fusa, is not as effectual in the latter respect, nor can the action of these caustics be readily limited to the desired spot. Chromic acid, however, is said to be very effectual. Following the advice of some authorities, I at one time employed the ligature; but it has seemed to me to be a clumsy and slow method of doing that which can be accomplished with less pain by the scissors in a few seconds. Whatever plan be adopted, however, the practitioner should take care to get a good view of the growth and its exact attachment before touching it; which view may be best obtained by an assistant separating the lips of the urethra rather widely with a couple of bent probes, while the patient is in the ordinary position for lithotomy.

In some very rare instances, a tumour has been found at the orifice of the urethra consisting of the *inverted bladder*. Dr. John Green Crosse, of Norwich, met with an example of this in 1829:—A healthy girl, between two and three years of age, had a tumour about the size of a walnut, projecting between the external labia. It was of a florid red colour, resembling a large strawberry; and the surgeon who consulted Dr. Crosse about its nature, believed it was a vascular tumour, which might be removed by ligature. Indeed, a few days afterwards a ligature was just about to be applied, when Dr. Crosse accidentally went to the patient's bedside; but fortunately this gentleman begged for a few minutes' grace while he gently pressed the swelling, as if to reduce a hernia, and found that the whole disappeared through the urethra. This canal was so dilated that Dr. Crosse was then able to fairly introduce his finger into the cavity of the replaced viscus. Had a ligature been applied, "the bladder would have been removed, including all its coverings, the ureters cut through just above their terminal orifices, and the peritoneal cavity largely opened." For sixteen years after the replacement there had been no relapse, but the patient was troubled with incontinence of urine.*—A similar case was under the observation of Dr. Murphy:—Jane R., ætat. 4, was admitted into the Meath Infirmary, 9 July, 1829. A pyriform tumour, about the size of a small hen's egg, and the colour of dark mahogany, was seen between the labia. It had been mistaken for prolapsus ani by the gentleman who first made an examination. On drawing the tumour downwards, the orifices of the ureters were seen, and a small silver probe was passed up each. The bladder was easily replaced, and after a few inflammatory symptoms had subsided, she was discharged cured.†—A third instance, in which the inversion was congenital, has been reported by Dr. Lowe, of the West Norfolk and Lynn Hospital. The patient was two years and a half old, and the bladder was seen between the labia like a vascular tumour, the size of a large Italian walnut. After replacement, a natural condition of the urethra was induced by the application of the actual cautery on five separate occasions.*—And lastly, a fourth case has been published by Dr. Beatty, in which the child was nearly two years old, and had suffered from the inversion for eleven months. There was also prolapsus of the rectum. The bladder was easily pushed back through the urethra; but while under treatment the girl died of croup.† Examples of inversion of this viscus through vesico-vaginal fistulæ are more frequently met with; but such cases have nothing in common with those which have now been considered.

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* *Transactions of the Provincial Medical and Surgical Association*, vol. xiv. p. 185. London, 1846.

† *London Medical Gazette*, p. 525. 19th January, 1833.

2. URETHRITIS.

Acute or chronic inflammation of the urethra may occur independently of gonorrhœa, or of inflammation set up by irritating uterine discharges.

The *symptoms* consist chiefly of a feeling of heat along the urethra, great pain on passing water, a muco-purulent discharge, and irritability of the bladder. The urine may be found loaded with urates or with uric acid, or it may be albuminous or bloody, or it may contain pus or ropy mucus. On examination, the lips of the meatus can be seen to be morbidly vascular and swollen; while sometimes the mucous lining is everted, and highly sensitive. The canal of the urethra will be felt indurated, like a cord, beneath the symphysis pubis; while it is tender on pressure. The inflammation will possibly cause retention of urine from spasmodic stricture; which, however, should be relieved by a hot hip-bath rather than by the use of the catheter, as the passage of this instrument causes most acute pain. There is usually considerable constitutional disturbance, with nervous irritability.

Simple *treatment* commonly suffices to remove this disease. Hot hip-baths, fomentations, rest in bed, an unstimulating diet, and a free supply of demulcent drinks are the principal remedies. Opium in combination with belladonna (F. 344) may also be given; or a pessary of belladonna and bismuth (F. 423), introduced nightly into the vagina, will give great relief. In chronic cases, a cure can often be effected by passing the solid nitrate of silver into the canal for a few seconds; or this failing, a capsule of balsam of copaiba will possibly be advantageously administered by the mouth three or four times a day.

3. URETHRAL STRICTURE.

Stricture of the urethra is not a frequent affection in women. Two well-marked instances have come under my care; and as they illustrate the symptoms and treatment of organic contraction of this canal, a short notice of them may be useful. The first example met with was the following:—Mrs. S., thirty-six years of age, applied to me in May, 1859. Has never been pregnant; the catamenia are regular, but very abundant; and the general health is bad. Has suffered from stricture of the urethra for some years, with occasional attacks of retention of urine. She has to pass water very frequently, being obliged to rise five or six times every night to do so. Was under the care of Mr. Travers until his death: this gentleman attempted to effect a cure by the use of caustic. On examination by the vagina, I found the urethra hard like a cord, but not over-sensitive on pressure. A number one male catheter was introduced into the bladder with great difficulty: the stricture seemed quite cartilaginous. Day by day, however, a larger instrument was passed, until a number twelve entered easily. The menorrhagia was due to a large fibrous tumour in the cavity of the uterus; which tumour was subsequently removed, after dilating the os uteri. There was no return of the stricture up to 1869, or of the irritability of the bladder; but she passed a large-sized gum elastic catheter about every fortnight, and found some slight difficulty in doing so, if the use of the instrument were omitted for three or four weeks.—The second patient, sent to me by the previous one in May, 1860, had suffered from stricture of the urethra for three years. She had to pass water almost constantly, unless it dribbled away, as it mostly did. There was much difficulty in introducing the smallest silver catheter; but by perseverance it was made to enter the bladder, and was then retained in the urethra for some hours. In a few days a large-sized instrument entered easily; and soon a number twelve could be used. She was directed to pass an elastic catheter every week. On the 17 October, 1861, I heard that there had been no relapse. The cure was complete.

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* *The Lancet*, p. 250. London, 8th March, 1862.

† *Dublin Quarterly Journal of Medical Science*, vol. xxxiv. p. 189. 1862.

With a hint or two on *female catheterism* the subject of urethral stricture may be dismissed. Where the practitioner is only occasionally called upon to introduce the catheter, he finds that this proceeding is not so easily accomplished as many authors assert. The simplest plan is to make the patient lie upon her back, with the thighs separated and slightly drawn up; taking care that there is no exposure. The surgeon should then separate the labia and introduce the second finger of his right hand into the vagina, with the palmar surface upwards; along which, as on a director, he slips the instrument held lightly in the left hand. Thus, the catheter cannot enter the vagina, while it will almost certainly slip into the orifice of the meatus urinarius. It should be remembered that in elderly women who have had children, as well as in pregnant females, the meatus is often drawn into the vagina somewhat under the symphysis pubis.

4. CANCER OF THE URETHRA.

A cancerous tumour has been met with at the orifice of the female urethra as a primary growth—*i.e.*, independently of the extension of adjacent malignant disease. According to some authorities, a simple vascular tumour may acquire a carcinomatous nature; but I have never met with an instance corroborative of this opinion.

Two cases have occurred in my practice of cancerous infiltration of the walls of the urethra, but such instances are very uncommon. In one of these the opening of the vagina became narrowed, appearing to be drawn up by the contraction of the diseased mass on the under surface of the urethra; though the walls of the vagina were never involved in the infiltration. Between the commencement of the symptoms until death fifteen months elapsed. With the second case, which I visited in consultation with Mr. Marsh, of St. John Street, Clerkenwell, the disease gradually spread along the urethra to the floor of the bladder. The suffering in urethral cancer is very severe; being at first aggravated by repeated attacks of retention of urine, and at a later stage (when ulceration has set in) by inability to retain a drop of the renal secretion. I hardly know which state is the most distressing,—the pain of passing a catheter through the tight and tender stricture being a frequent source of misery, while the discomfort and stench and excoriations produced by the constant escape of the urine become almost unbearable.

The treatment of cancer in this situation must be conducted on the principles which have already been laid down in speaking of the disease generally.

III. STONE IN THE BLADDER.

In whatever way the fact may be accounted for, it is certain that stone in the bladder is a very rare disease in women. This is well shown in a paper by Mr. Smith, surgeon to the Bristol Infirmary; from which essay we learn that out of 354 cases of vesical calculus, operated upon in that institution during the previous 83 years there were only 7 females, and all of these were under 35 years of age.* Mr. Coulson also remarks that out of 2238 patients, 111 were females, making a proportion of 1 female to 20 males: while by the estimate of Dr. Prout, the numbers are as 1 to 23.† According to some authorities, the comparative exemption of women from this disease is principally due to the facility with which calculi can spontaneously pass through the short and dilatable urethra. But this explanation is probably more specious than true; for numerous inquiries amongst gentlemen of experience have led me to believe, that renal calculi are much more commonly found in male than female subjects, and certainly cases of calculous nephralgia are very seldom met with in the latter.

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* *Medico-Chirurgical Transactions*, vol. xi. p. 1. London, 1821.

† *The Diseases of the Bladder and Prostate Gland.* Fifth Edition, p. 405. London, 1857.

The *symptoms* of stone in the female bladder resemble those presented in the other sex; with this exception, that the suffering is commonly more intense. There is pain in the urethra, back, and upper part of the thighs, generally increased by sexual intercourse and by walking; a sense of forcing down, like that which occurs in labour is experienced; there is often vaginal cystocele, procidentia uteri, and sometimes prolapsus ani; while there is either incontinence of urine, or very frequent calls to micturate. In one instance where I removed a phosphatic calculus nearly two inches long, one inch and a quarter broad, and 331 grains in weight, the patient had experienced the greatest pain in passing water; and yet she had been obliged to strain and void each drop of urine about every twenty minutes through the night and day. Moreover, in these cases, immediately after micturition, the patient feels that she has not emptied her bladder; while she soon learns that by further attempting to do so, her sufferings are greatly aggravated. The urine generally contains a quantity of ropy mucus; it may be loaded with urates, phosphates, or oxalic acid; while it is frequently bloody, and occasionally so to a marked degree. To examine the bladder, the patient should lie on her back, with the knees drawn up; and then there will be no difficulty in detecting the stone with the sound or silver catheter. Often, too, the calculus can be felt through the vesico-vaginal septum; and it is said that ballottement may be obtained, which might be mistaken for the motion imparted to a fœtus by the finger. The nature of the various forms of renal calculi having been already noticed, it is only necessary to say that these concretions in women often have very extraordinary nuclei. Young girls occasionally introduce foreign bodies—such as hair pins, short sticks of pencil, pieces of quill, fruit-stones, ear-picks, &c., into the bladder; and these, if allowed to remain, soon become coated with the urinary salts.

The *treatment* consists in extracting the stone by the method least liable to lead to subsequent incontinence of urine. There are four methods by which the removal may be accomplished. (1) Dilatation of the urethra by sponge tents, or by Weiss's three-bladed instrument, or by india-rubber bags which can be inflated after introduction, has often been resorted to; and by this practice large stones can be seized and extracted without risk to life. But whether the dilatation be produced slowly or rapidly, or while the patient is conscious or insensible from the inhalation of chloroform, it is very apt to be followed by permanent inability to retain the urine. My own view of this operation is so unfavourable, that I shall not again resort to it, unless there is some peculiarity in the case specially requiring such a proceeding. Yet if it is practised, I believe that there is more hope of preventing incontinence by rapid dilatation while the patient is under the influence of chloroform, than by slowly stretching the urethra with sponge tents, &c. (2) Incision with dilatation has been advocated. This operation consists in incising or notching the external orifice of the urethra, either upwards towards the pubes, downwards in the direction of the vagina, or laterally; and then stretching the canal with Weiss's dilator, until the finger can be made to pass into the bladder. The same objection, however, applies to this method as to the former one; and hence it is not to be recommended. (3) Incision of the bladder (vaginal lithotomy) has been recommended by Dr. Marion Sims. The surgeon cuts through the vesico-vaginal septum, low enough down to avoid the peritoneum, into the bladder upon a staff introduced through the urethra. The stone is seized by the forceps and removed; the edges of the wound being then brought together by metallic sutures, and the same treatment pursued as after the operation for vesico-vaginal fistula. For a few cases, where the stone is of large size and the bladder very irritable, this method will prove useful; but it ought only to be practised by a surgeon who feels thoroughly confident of being able to cure the vaginal fistula. (4) Lithotrity remains to be considered; and though mentioned last, yet I believe that in forty-nine cases out of fifty it is the only operation which should be resorted to for the removal of a stone from the female bladder. It is practised without much difficulty, is attended with so little pain that chloroform is not required, and unless the stone be large may often be completed at one or two sittings. The patient had better be directed to hold her water for about an hour before the operation. To allow of this being done without any inconvenience, it may often be advisable to administer the tincture of buchu, or a decoction of the triticum repens, for a few days previously; or the practitioner can trust to the use of the belladonna pessaries (F. 423), or of an enema containing about twenty drops of the fluid extract of opium and the same quantity of tincture of belladonna, in an ounce and a half of fluid starch. If, in spite of these sedatives, the urine come away, two or three ounces of tepid water ought to be injected just before introducing the lithotrite. On the day after the calculus has been well crushed, a short tube, having a diameter rather exceeding that of the largest-sized catheter, may be introduced through the urethra; and then the fragments of stone will generally be easily removed by washing out the bladder with warm water.

IV. DISEASES OF THE VAGINA.

1. VAGINAL OCCLUSION.

Putting aside those cases where the vagina is entirely absent, or is considerably malformed, from some arrest of development, it will be found that the examples of occlusion of this membranous canal met with in practice may be arranged under one of three heads:—(1) Those where the hymen is morbidly tough and persistent. (2) Instances of imperforate hymen, in which the vaginal orifice is completely closed. And (3) cases of imperforate vagina (atresia vaginæ); whether this be due to congenital adhesions between the opposite walls, or to closure in consequence of inflammation and sloughing, or to almost impermeable cicatrices the result of prolonged or instrumental labour or other mechanical injury.

A tough and persistent hymen gives rise to no inconvenience until sexual intercourse is attempted; for it does not interfere with the escape of the catamenia, or of vaginal discharges. The practitioner is therefore only consulted when the rigidity of the membrane is such that it prevents intromission of the male organ. In this way, the hymen will usually be a cause of sterility; although many cases are on record where fecundation has occurred while perfect connexion must have been impossible. Some years since, a medical man, now dead, consulted me, two months after marriage, as to the propriety of his dividing the hymen with the bistoury; as he found this structure so unyielding that he had been unable to break it down. And yet, at this time, the lady was three or four weeks advanced in pregnancy, and had just missed her catamenial period. The operation, however, was performed, and all further inconvenience obviated.—In another patient, I found at the time of labour that the hymen had simply been perforated through its centre, the upper portion forming an irritable band which only yielded to the use of the knife.—The treatment of persistent hymen is very simple. If the membrane cannot be ruptured with the finger, it should be divided; reunion being prevented by the careful use of oiled lint. Where the vaginal orifice remains preternaturally small after this operation, dilatation ought to be effected by the use of bougies.

Naturally, the hymen consists of a delicate semilunar fold of mucous membrane, stretched across the lower half of the vaginal orifice. But occasionally cases are met with, where this canal is completely closed from the urethra to the fourchette by a firm membrane. In these examples of *imperforate hymen,* it is most important that a cure be effected before the patient reaches the age of puberty. Fortunately it usually happens that the presence of this membrane is discovered by the child's mother, while the girl is quite young; and then there is neither difficulty nor danger in the surgeon breaking through the structure with a probe or director, or in cautiously dividing it with a bistoury. The edges of the wound must be kept apart by the introduction of small pledgets of oiled lint for a day or two, until cicatrization is complete.

Supposing, however, that the malformation is not remedied, important symptoms will be produced at the time of menstruation. For inasmuch as the membrane may present no orifice whatever, or (as most commonly happens) only a very small oblique one just below the urethra, so the proper escape of the catamenia must be prevented. The patient will experience all the general feelings and straining efforts (the menstrual molimina) which accompany the early monthly periods, but there will be no external discharge. As each time comes round, the constitutional disturbance, the backache, the sense of bearing down, and the feeling of weight about the pelvis will increase; and yet the cause of the loss of health and languor, of the irritability of the stomach and the sallowness of complexion, &c. may be unsuspected by the parents. The girl probably holds her tongue; either for the simple reason that she is ignorant of what should occur, or else because she is afraid and ashamed to make any complaint. In this way it sometimes happens that the vaginal canal and the uterine cavity become greatly dilated, while in a few instances the Fallopian tubes have also been considerably enlarged; for the retained menses may, in the course of time, amount to as much as three or four pints, or even more. If, in addition to the presence of this membrane there be also occlusion of the os uteri, the catamenia will of course only accumulate in the cavity of the womb and in the canals of the oviducts; these organs gradually enlarging until perhaps the uterus can be distinguished through the abdominal walls as large as at the sixth or seventh month of pregnancy.

Now it is a curious fact, and one difficult of explanation, that where the menses have been retained owing to this imperforate condition of the hymen, the operation required is a very fatal one. On examining a woman so affected, the practitioner readily detects the bulging obstructing membrane at the orifice of the vagina; and it would seem a very simple proceeding to divide this septum and so permit of the escape of the distending treacle-like and fetid fluid. But however easy it may be to do this, it is well known that many of the cases which have been so operated upon have terminated fatally from endometritis or peritonitis; these inflammatory affections probably having their origin in some septic change produced in the imprisoned secretions by the action of the atmosphere. Nevertheless, in order to avoid ulceration and rupture of the walls of the uterus or of the Fallopian tubes, or an escape of the menstrual fluid through the fimbriated extremities of the tubes (pelvic hæmatocele), the obstruction must be removed either by a longitudinal or a crucial incision through the thickened hymen; though instead of looking on this proceeding lightly, every precaution ought to be taken to prevent inflammation subsequently. The patient must be kept very quiet in bed, her diet should be plain without being too low, and if there be pain it ought to be relieved by sufficient doses of opium. The bowels should be freely opened just before the operation, and then left quiet for some days. I would administer some preparation of sulphurous acid (F. 48) for several days prior to the surgical interference. A bandage had better also be placed round the lower part of the abdomen so as to facilitate the flow of the discharge. It is apparently safer, at first, to draw off part of the fluid with a trocar and cannula introduced under water while the patient is in a warm hip-bath, or the withdrawal of the fluid may be effected by the aspirator, or with the antiseptic precautions recommended by Mr. Lister. It is not improbable that the effect of the air upon the retained secretion in setting up decomposition might in this way be prevented. After the operation careful dressing with oiled lint must be had recourse to, so as to prevent adhesions forming between the labia; while even for some months afterwards examinations ought to be made now and then, lest dilatation be required to prevent the vaginal orifice from getting constricted.

The vaginal opening appearing quite normal, it may yet happen that the passage is more or less completely closed at some part of its course. *Imperforate vagina* from the presence of a thin transverse membrane, is the most simple congenital malformation of this description; and if this structure present an opening sufficiently free to allow of the escape of the catamenia, no inconvenience will result until the time of marriage.—Comparatively harmless also is the division of the vagina, from the entrance to the os uteri, by a longitudinal partition. In these cases there is always a double uterus as well as the double vagina; and though generally one division of the latter canal is larger than the other, and is the only one which is used in coitus, yet cases have occurred where either portion has been used indifferently, and where pregnancy has taken place in both halves of the uterus at the same time.—A much more serious condition is the conversion of a portion of the canal into a solid cord, owing to firm adhesions between the walls; so that on introducing the finger into the short vagina, this tube is found to end in a cul-de-sac. In these instances, the uterus and ovaries are usually either absent, or they exist in only a rudimentary state, so that there will be no secretion of the menstrual fluid. But if these organs be present and healthy, the catamenia will be retained and will gradually produce a tumour as in the cases of imperforate hymen.—Stricture or complete closure of the vagina may result from inflammation set up by disease, or it may be a consequence of the healing of cicatrices after injury inflicted by the use of instruments in a difficult labour. An interesting example of the first form has been reported by Mr. Hancock. In this case, the external organs of generation appeared healthy, but the vagina terminated about an inch from the orifice. The patient stated that she had menstruated regularly for two years: she then had an attack of fever, and the discharge never returned. Mr. Hancock dissected the tissues upwards for three inches, and afterwards dilated the canal by bougies; but no uterus could be discovered. There was no evidence of the existence of any collection of menstrual fluid.* Examples of stricture from the healing of cicatrices are not so very uncommon. I have seen a woman in strong labour, with almost complete obliteration of the vagina, as the consequence of ulceration and sloughing produced by the prolonged pressure of the head in the previous confinement. In April, 1851, I was consulted by Dr. Greenhalgh as to the best mode of effecting delivery in a woman slightly advanced beyond the eighth month of her fourth pregnancy; craniotomy having been required in the third labour. On examination, the canal of the vagina appeared to be one firm contracted cicatrix; although, after some perseverance, the finger could be insinuated between three or four small rings of cartilaginous toughness, with sharp edges. In this instance labour was brought on, the woman being safely delivered after the free division of the rings and the perforation of the child's head; but I found it impossible to avoid wounding the rectum, the fistulous opening which formed necessitating subsequent treatment. Moreover, the strictured tissues were not incised, nor was the fœtal skull opened, until it was proved that the parts showed not the least disposition to yield, although the labour pains were strong and recurred frequently.

While considering how we may best remedy these cases of imperforate vagina it should be remembered, that all operations upon this canal are attended with more or less decided risk. Consequently, it will be better to refuse to interfere when the woman is single, and the catamenial flow is not obstructed. Moreover, it will be useless to attempt any surgical proceeding where the patient, being an adult, experiences no menstrual molimen, and has no sexual desire; for we may be tolerably sure the malformation is not confined to the vagina, but that the uterus and ovaries are also entirely absent, or at least that they are in a very rudimentary condition.†—When the obstruction consists of transverse membranes, we shall often succeed in breaking them down with the finger, or in dilating them with bougies and sponge tents. But if it be necessary on account of the thickness of the tissues to use the knife, great caution must be exercised to avoid wounding the bladder or rectum, as well as to prevent the sharp point of the scalpel from entering the cavity of the peritoneum above. To evade these accidents, the patient should be placed in the ordinary position for lithotomy; a sound ought to be introduced into the empty bladder, while sometimes it is advisable for the surgeon to keep the forefinger of his left hand in the rectum; the edges of the vaginal orifice are to be held widely apart by the hands of an assistant, or by Bozeman's duck-bill speculum, as in the operation for vesico-vaginal fistula; and then the septum had better be cautiously dissected through from side to side, until there is a gush of thick treacle-like fluid—the retained catamenia. Where this operation has been safely accomplished, care is to be taken to prevent any subsequent contraction; inasmuch as by inattention to this rule, interference has been required on a second occasion.—With regard to those rare cases where the vagina ends in a cul-de-sac, a thorough investigation should be made so as to detect the smallest opening which could be dilated by bougies and tents. Supposing there is no orifice and no depression showing where there might be one, and if it be certain that there is an accumulation of the menses in the uterine cavity, it then becomes a question whether a dissection should be made in the manner already described, or whether the uterus had better be punctured through the rectum so as to permit of the evacuation of its contents. The latter proceeding, though only justifiable where the former seems impracticable, has been successfully adopted in several instances. It is, however, always difficult to keep the artificial opening sufficiently patulous to allow of the woman menstruating for the future through the rectum; though this may be accomplished by, in the first instance, making the puncture sufficiently

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* *The Lancet*, p. 470. London, 21st May, 1853.

† There are occasional exceptions to this rule. Thus, I was consulted by a young lady, in her twenty-first year, who had never menstruated, but who was engaged to be married. An examination showed that though the

external parts were perfectly natural, there was no vagina. No trace of this canal, or of uterus or ovaries, could be detected by the rectum. Being strongly urged to try some means of giving relief I made a cautious dissection through the connective tissue where the vagina should be; and without injuring the bladder or rectum, or discovering any trace of internal generative organs, I succeeded in making an excellent canal. In this, to prevent contraction, a vulcanite tube four inches long by four in circumference was worn for several months. The operation was performed on the 20th June, 1867. On the 15th September, 1868, this lady was married; the impossibility of her ever bearing children, as well as all other material points in the case, having been previously explained to the husband. Both parties, however, were determined on carrying out their engagement. Had it not been for this explanation, I am told it would not have been known that there was anything unusual.—In another exactly similar case the patient was actually married before she consulted me. An artificial vagina has since been made. Although no trace of uterus or ovaries can be detected, there is no loss of sexual appetite. No menstrual molimen has ever been experienced.

free to admit the point of the finger, and then by daily examinations preventing closure until the healing process at the edges of the wound is completed.

2. VAGINISMUS.

By this term Dr. Marion Sims has proposed to designate "an involuntary spasmodic closure of the mouth of the vagina, attended with such excessive supersensitiveness as to form a complete barrier to coition."* This affection must occasionally have been recognised by all practitioners who have had much experience in the treatment of the diseases of women; but to Dr. Sims is due the great credit of especially directing attention to it, of clearly describing its symptoms, and of suggesting the means of cure.

A few remarkable cases, in each of which there has been a combination of lead poisoning with vaginismus in its most intense degree, have been observed by Dr. Neftel of New York. The cause of the poisoning could only be traced to the long-continued employment of a cosmetic containing lead. The chief feature of interest, however, in these patients was this,—that the proper treatment of the saturnin poisoning not only removed the paralysis, but likewise cured the severe vaginal hyperæsthesia. Had it been otherwise, the combination of the two diseases would of course have been regarded as accidental. As it is, such an explanation is merely an easy way of evading a difficult question.

From the cases which have been under my own care, I believe that vaginismus may exist as a simple or as a complicated condition. In other words, there may be no local mischief beyond excessive tenderness of the orifice of the vagina and hymeneal membrane; so that almost the slightest touch, certainly any attempt to introduce the finger into the canal, produces the greatest agony. Or, in addition to this characteristic symptom, there may be indications of inflammation of the follicles about the vulva, or of a painful fissure of the fourchette, or of hyperæsthesia of the whole vaginal mucous membrane, or of some uterine displacement, or of a contracted state of the os uteri and cervical canal. But whether the disease exist in a complicated form or not, it is equally the bane of early married life. In some instances the woman may at first submit to intercourse, bearing the great suffering under the idea that it is not unusual. After a night or two, however, her courage fails, her nervous system begins to give way, she shivers with terror at the approach of her husband, and consequently all attempts at connexion have to be abandoned. In another class of cases it is found that the marriage has never been consummated; or intercourse may have been imperfectly accomplished, but only with the result of setting up inflammation and excoriation about the vulva. The seat of this excessive sensitiveness is the vaginal outlet and especially the external surface of the hymen, whether this membrane be entire or partially broken down. The gentlest application to this structure or its remains (the carunculæ myrtiformes) produces spasm of the sphincter vaginæ, so that even a probe can scarcely be introduced beyond it. The influence of this condition upon the general health can readily be imagined. The mental distress, the imperfect sleep, the loss of appetite, and perhaps the pain on walking, the irritability of the bladder, the backache and tenderness about the hips, &c., all tend to render the sufferer an unhappy invalid. She looks care-worn, her strength gradually fails, and she gets thin; and if there be any unkindness on the part of the husband the misery becomes intense.

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* *Transactions of the Obstetrical Society of London*, vol. iii. p. 362. London, 1862.

Fortunately, if the suffering be great, the cure is not difficult. Supposing by a lucky accident the attempts at intercourse have led to pregnancy, then interference will be unnecessary; since the act of parturition will certainly prove an effectual remedy. Usually, however, sterility is one of the prominent results of true vaginismus. Under such circumstances it seems to me worse than useless to temporize with inefficient remedies, since they only increase the mental and bodily distress. The use of bougies, caustics, injections, &c. merely inflicts the greatest pain, without producing the slightest good. The treatment consists, as Dr. Sims very properly insists, in the removal of the hymen, the incision of the vaginal orifice, and in subsequent dilatation; and these proceedings should all be promptly and efficiently carried out. The bowels are to be thoroughly cleared out on the morning of the operation. Then the patient being placed on her left side, or upon her back, and being fully under the influence of chloroform, the sensitive and probably thickened hymen is to be seized with the forceps and completely dissected off. At the same time, the operator stretching the vaginal opening with two of the fingers of his left hand, makes an incision, about half an inch deep, through the fibres of the sphincter vaginæ at the lower part of the fourchette. If there be much bleeding it may be checked by the application of a drop or two of the solution of perchloride of iron; though I think that the after-treatment is rendered more easy by plugging the vagina with cotton-wool, laying pledgets of oiled lint over the lower part of the orifice, and then keeping the whole in apposition by a T-bandage. The chief inconvenience attendant upon this latter measure is, that the catheter will have to be used every eight or twelve hours. The dressings ought not to be disturbed for forty-eight hours, during which time freedom from pain must be ensured by the use of opium. There should also be perfect quietude. At the end of this time, chloroform is to be again administered, while the wool and lint are removed; and then a proper-sized tube of vulcanite is to be introduced, and kept in position by a bandage. If grooved upon its upper surface this tube will not interfere with the urethra or meatus urinarius; and it should be worn for a few weeks. The smarting caused at first by this instrument is nothing as compared with the pain which has been experienced prior to any treatment.—This procedure is rather different from that recommended by Dr. Sims; but it has the advantage of being less severe, while from actual experience I can assert that it is quite as efficient. I have said nothing about the management of the complications, because they will have to be remedied subsequently according to the rules laid down in speaking of each affection separately.

3. ACUTE VAGINITIS.

This form of inflammation is much more rarely met with than the chronic variety; from which it differs not only in its greater severity and more rapid progress, but also in its usually involving the whole tract of mucous membrane lining the vaginal canal, instead of being limited to one portion. Moreover, in acute vaginitis the morbid action is not always confined to the mucous membrane; the tissues beneath sometimes becoming involved, producing a very distressing affection. It is seldom observed in women who have not had intercourse.

Causes.—This disease, unless due to some specific poison, rarely occurs save in those who are in a depressed state of health. When the vital power is low from bad living or from the excessive use of alcoholic drinks, the inflammation may be excited by exposure to cold and wet, and perhaps by inattention to cleanliness. Hence it is more frequently met with in hospital than in private practice. Excessive sexual intercourse can, however, give rise to it; and so will the use of force—as in rape. The prolonged pressure of the child's head in tedious labours, as well as mischief inflicted by craniotomy instruments or the forceps, must also be remembered as causes. I have never seen it produced by rising too soon after parturition, and cannot believe in such a proceeding having any effect in inducing this form of inflammation.

Symptoms.—The chief symptoms consist of itching and excoriation about the vulva, weight at the perineum, distressing irritability of the bladder, with pain and a sense of heat extending up the vagina. At first, the secretion of vaginal mucus is checked; so that on examination the mucous membrane of the canal is found somewhat dry and swollen. There may be no alteration in colour from the natural appearance: more often the whole tissue is seen of a scarlet tint, or it is marked with red patches. Then, shortly, a creamy mucous, or muco-purulent, or purulent discharge takes place; the pain lessening as the fluid poured out becomes abundant. This discharge, like the healthy vaginal mucus, is of acid reaction; while if it can come away freely it is seldom offensive. A minute examination shows that it contains pus corpuscles, with an abundance of squamous epithelium and epithelial débris. The constitutional disturbance is usually slight; but there may be more or less backache, pains about the hips and upper part of the thighs, a sense of weight or bearing-down on standing, smarting and tenderness on sitting down or on passing a motion, with a frequent desire to empty the bladder. The disease commonly runs its entire course, or passes into the chronic form, in from seven to thirty days; the duration partly depending upon whether a cure can be effected before the return of a catamenial period, as otherwise the symptoms are sure to be aggravated by the menstrual molimen.

Sometimes, owing to neglect or to the severity of the attack, the progress towards recovery gets interrupted. Thus, supposing there occurs a sharp rigor, with severe frontal headache, thirst, a loaded tongue, and a frequent pulse, we may be tolerably certain that the morbid action has extended to the structures beneath the mucous lining, and that it is advancing to suppuration. Under such circumstances the local soreness and the throbbing pains will prove most severe. In this way, a troublesome and very painful affection may be set up which will continue for many weeks, to the marked injury of the general health. The abscesses which form generally burst into the vagina; though the pus is apt to burrow and make its way externally, either at the sides of the labia or about the perineum, probably leaving long and tortuous fistulæ which can only be healed with great difficulty.

Diagnosis.—Acute vaginitis can scarcely be confounded with acute inflammation of the cervix uteri. The appearances on examination and the nature of the discharge will serve to prevent any error. The mucus of the cervical canal is always alkaline; and though the acidity of the vaginal secretion will neutralize a moderate quantity of uterine discharge, yet it will not suffice to do so when the latter is abundant. Moreover, the menstrual functions are probably never interfered with when the disease is confined to the vagina; though this secretion commonly appears too frequently, too abundantly, and is accompanied with much pain when the uterus is affected.—The difficulty of distinguishing between non-specific vaginitis and gonorrhœa has already been noticed. The application of the discharge poured out in acute vaginitis to the male urethra, will produce a disease in all respects resembling true gonorrhœa.

Treatment.—When the case is seen early, no remedy gives so much relief as the prolonged use of the hot hip-bath, night and morning. In severe cases it will be well to add some carbonate of soda and a strong decoction of poppy capsules to the bath water. The bowels, which may be obstinately confined, should be unloaded by a full dose of castor oil, or of calomel and jalap (F. 140), or of jalap and senna (F. 151); after which it is unadvisable to irritate them further by purgatives. Vaginal injections of warm water prove serviceable; but instead of sedative or astringent injections, pessaries of oxide and zinc and belladonna, or of acetate of lead and opium (F. 423) will be found most efficacious. The patient should be confined to the sofa, or even to the bed, at the commencement. The diet is to consist of white fish, lightly-cooked eggs, tea and milk, with demulcent drinks; while all stimulants are to be forbidden. Where there is evidence of the occurrence of suppuration, opium and henbane (F. 343, 345), with ammonia and bark (F. 371), will be needed; and then nourishing animal food, with wine, ought to be allowed. Hot fomentations, or large linseed poultices, to the lower part of the abdomen as well as to the vulva, should be employed. When the abscesses begin to "point," they had better be opened.

4. VAGINAL CATARRH.

Chronic inflammation of the vagina may occur primarily and singly, or it can happen as an accompaniment of most uterine diseases, or it may be the sequel of acute vaginitis. Probably chronic vaginitis, or vaginal catarrh, or vaginal leucorrhœa (for the terms may be regarded as synonymous) is the most common disorder to which women are liable. There are indeed few who do not more or less suffer from it during the child-bearing period of life,—so numerous and even slight are the causes which will induce it.

Symptoms.—The prominent symptom is a constant or frequent leucorrhœal [from Λευκὸς = white + ῥέω = to flow] discharge—"the whites." Advice is seldom sought until this discharge has become profuse, or has continued a long time; and then, in addition to speaking of it, complaint is made of backache, a sense of weariness after slight exertion, loss of appetite, lowness of spirits, flatulence or nausea or some other form of indigestion, and frequently of constipation. This low kind of inflammation is often confined to the upper part of the vagina, and to the external portion of the cervix uteri; in which districts the mucous membrane may perhaps be found on examination congested and of a purple tint, though more commonly there is no perceptible change. The disease is always obstinate, partly because it gets aggravated at the return of each monthly period.

Under the influence of inflammation the epithelial covering of the mucous membrane of the vagina will now and then be exfoliated. Sometimes this epithelium mixed with mucus comes away in flakes, or it may be passed in masses which form complete casts of the vaginal canal. By the microscope these pseudo-membranous, parchment-like laminæ can be seen to be composed of large epithelial cells of the tesselated variety; and they are generally sufficiently strong and firm to bear free handling. They are not unfrequently expelled when slight inflammatory action has been set up by the use of strong astringent injections. So again, in the vaginitis which occurs after scarlet fever, detached fragments of epithelium will commonly be discovered in the discharge. The symptoms attendant upon this exfoliation are slight or well-marked, according as a new and sufficiently dense layer of cells is slowly or rapidly formed. In the latter case, there may be merely slight heat and irritation: in the former, the raw surface is very sensitive, and there will be much pain and smarting. In either instance, as the membrane is becoming detached, a peculiarly unpleasant crawling sensation has been complained of. Care must be taken not to confound these vaginal membranes with those uterine structures which are not unfrequently thrown off in one form of painful menstruation—membranous dysmenorrhœa.

Diagnosis.—In a state of perfect health only sufficient mucus is secreted to lubricate the flattened vaginal canal, and so prevent irritation from the friction which necessarily occurs between the apposed anterior and posterior walls. But under the influence of many morbid conditions, a more or less abundant discharge comes away; and the important question which generally arises is as to the seat of this flow. In other words, is the case one of vaginal or of uterine catarrh? The distinction can generally be drawn from an examination of the discharges. Thus, the vaginal mucus, whether scanty or abundant, is universally acid; and it is owing to this reaction that the secretion is found opaque and curdy. The mucus of the cervical canal is always alkaline; so that if a piece of litmus paper be reddened by application to the vaginal portion of the cervix, the blue colour will be restored on passing the test paper within the cavity. Moreover, the mucus as it is seen by the speculum escaping through the os from the interior of the cervix, is viscid and transparent, so that it resembles the white of egg; though it becomes opaque as it passes through the vagina owing to the action of the acid reaction. A minute examination shows that the discharge from both parts consists of epithelium, mucous or pus corpuscles, and a plastic liquid; but the vaginal epithelium is of the pavement or tesselated variety, while the cervical is of the cylindrical kind. Of course, where there is chronic vaginitis in conjunction with disease of the interior of the cervix, then the discharge will necessarily partake of the nature of both secretions. Moreover, when there is an abundant secretion of pus from the vaginal mucous membrane this fluid may be found alkaline. Unless the bodily strength becomes much depressed, the menstrual functions are not interfered with in cases of vaginal leucorrhœa.

Treatment.—As in other disorders, the first point is to remove the cause. The general health must be attended to, one of the mineral acids with bark or quinine being administered if necessary; while the digestive organs should be made to do their work efficiently, pepsine sometimes proving useful for this purpose. The frequency of sexual intercourse ought at least to be limited. Any disease of the urethra, vulva, or rectum which may be present is to be cured. Then, cold salt water hip baths, and astringent vaginal injections (F. 425) are to be employed; the latter being used in quantities of not less than a pint at a time, while they are to be thrown up slowly and deliberately with a proper syphon syringe. It is rather remarkable that the small old-fashioned glass and metal female syringes are still to be found in every druggist's shop, and yet more useless instruments could scarcely be manufactured. After a cure has been effected, the woman who desires to remain well will inject up the vagina a pint of cold or tepid water every morning, while using the bidet for the external organs. Where injections fail to give relief, pessaries containing sulphate of zinc or tannin (from ten to fifteen grains of either with sixty or eighty grains of cacao butter) may be substituted. Moreover, if the pain in the back continue bad, a belladonna plaster had better be applied; while the system is to be strengthened by tonics, sea air, &c. As a rule, the diet should be generous and nourishing; while if any stimulant be needed weak brandy and water had better be allowed in preference to wine or beer.

In not a few instances I have found that a low form of inflammation has been kept up by the irritation of a painful *fissure* or *ulcer* at the fourchette. Although this can sometimes be cured by two or three days' rest in bed, and the application of the dilute solution of subacetate of lead, or of zinc ointment; yet this plan often fails. The most certain and efficacious proceeding is to make a longitudinal incision, the eighth of an inch in depth, through the ulcer, so as to divide the fibres of the sphincter vaginæ muscle. The patient ought to remain in bed until the wound has healed; and if cicatrization proceed too slowly the red lotion (F. 264) may be used as an efficient dressing.

The foregoing remedies will have but little influence for the cure of uterine catarrh. In such cases, therefore, the treatment described in a subsequent page will have to be adopted.

5. TUMOURS OF THE VAGINA.

A physician may be engaged for many years in treating the diseases peculiar to women before he meets with a case of *polypus of the vagina*. Tumours so designated, having a firm fibrous structure, do occasionally grow, however, from one or other of the vaginal walls. In an instance which came under my own observation, advice was sought for a "falling of the womb." On examination, a firm growth could be detected presenting at the orifice of the vagina. By gently drawing the tumour downwards it was seen to be as large as a small orange, having an attachment to the middle of the posterior wall of the vagina by a pedicle equal in circumference to that of the little finger. The chief inconvenience which resulted from this body consisted of an abundant leucorrhœal discharge, a constant bearing-down, and some irritability of the rectum and bladder. As a vessel could be felt pulsating in the pedicle, a ligature was placed around it, and then the growth was cut off just below the constricted part. The ligature came away on the fifth day, and the patient has since remained well.

More rare even than the foregoing are *fibrous tumours imbedded in the submucous tissue of the vaginal wall.* When a growth of this description exists, it may produce very slight general or local derangement; though usually the vaginal walls get inflamed and excoriated, much as they do when long irritated by any kind of foreign body. Sometimes there is bleeding to a considerable extent: in a case which was under the care of Sir James Paget the tumour gave rise to repeated attacks of vaginal hæmorrhage. Mr. Curling extirpated one of these growths which projected at the vulva, was extensively ulcerated, and was the cause of an irritating fetid discharge. The tumour was formed of a mass of dense fibrous tissue, partly arranged in lobules; while it was developed in the submucous connective tissue of the vagina. Sometimes these tumours are associated with similar growths in the uterine walls. Whether this be the case or not, or whether the growth be troublesome or not, a cure should be effected, if possible; for such a body may grow to a large size, while in the event of pregnancy it would certainly complicate the process of parturition. The removal may probably be safely accomplished by seizing the growth with a pair of vulsellum forceps, drawing it downwards, dividing the mucous membrane covering it, and then shelling it out with the fingers or the handle of the scalpel. If there be any free bleeding, the vagina should be firmly plugged with cotton wool.

Mucous follicular cysts are occasionally found about the walls of the vagina. When *superficial*, the cyst is formed by a dilated follicle, the excretory orifice of which has become closed: it seldom attains a larger size than a pea, since its thin coats are easily ruptured: often there is only a simple round cyst, though two or three may be met with, their walls being transparent: and they are most commonly situated about the vestibule, or at the sides of the lower part of the vaginal opening. The *deep-seated* cysts are produced by the accumulation of the contents of the interstitial or closed follicles; and one or more of this variety may exist alone, or in combination with the superficial kind. Usually solitary, these cysts will vary in size from that of a hazel nut to that of a fowl's egg; they are painless, but produce an unpleasant sense of fulness; they may become pediculated; they seldom rupture spontaneously, owing to the firmness of their smooth and shining coats; and they are almost invariably situated at the upper part of the vagina, near the cervix uteri. To cure either the superficial or deep cysts it is necessary to puncture them, and then to apply the nitrate of silver to their internal surfaces. Where pediculated, it is better to snip them off with a pair of curved scissors. In operating upon the deep kind, care must be taken to avoid wounding the bladder when the tumour is in the anterior walls of the vagina, or the rectum when the posterior wall is the affected part.

6. PROLAPSUS OF THE VAGINA.

The descent of the vaginal walls is generally accompanied by more or less prolapsus of the uterus, although occasionally it occurs alone. Seeing that the uterus is partly kept in its place by the vagina, it is difficult to understand how the latter can become prolapsed without the former also falling. Certainly I have never met with an example of complete and uncomplicated vaginal prolapsus in a single woman. And even among married women, such an event is rare; the cause, in those cases which have come under my care, having been either a failure in the walls of this canal to recover their tone after several pregnancies and labours, or a withdrawal of their support in consequence of a laceration of the perineum.

Much more common than these cases of complete, are those of partial prolapsus—where either the anterior or the posterior wall of the vagina descends. The anterior wall, according to my experience, is less frequently displaced than the posterior. When the anterior wall is alone affected, this portion in its fall draws down the posterior wall of the bladder; giving rise to a condition which is generally known as *vaginal cystocele*, or *vesico-vaginal hernia*. The result of this is the formation of a vesical pouch; in extreme examples of which condition the urine may accumulate and decompose and set up vesical catarrh, owing to the difficulty which is experienced in completely emptying the bladder. Patients repeatedly have to remove this difficulty by pressing the vaginal protrusion upwards during each attempt at micturition, although complete reduction cannot always be thus effected. If a catheter be passed into the bladder, the end of the instrument can be felt in the pouch through the vaginal wall. On passing the finger along the upper surface of the protrusion its progress is stopped under the pubic arch; but below the tumour it can be made to enter the vagina up to the os uteri.

The lower part of the anterior wall of the rectum is apt to become dilated; a pocket being formed which pushes forward the posterior wall of the vagina, and ultimately causes a protrusion at the vulva. This displacement is spoken of as *vaginal rectocele* or *recto-vaginal hernia*. It is the consequence of a loss of elasticity in the vaginal septum, of habitual constipation, and of excessive straining to pass the accumulated fæces. It may produce but slight inconvenience at first; but after a time, as the rectal pouch increases in size and becomes loaded with dry and hard fæcal masses so that the external tumour is made to acquire the size of a fist, troublesome consequences ensue. The chief of these are,—a sense of weight and bearing-down, pain on walking, a constant mucous discharge from the irritated mucous lining of the rectum, as well as a varicose condition of the hæmorrhoidal veins. On introducing the finger into the rectum it will readily enter the diverticulum when this is empty; or it will come upon the dense and firmly lodged stercoraceous mass.

Supposing a loop of small intestine to descend into the cul-de-sac between the rectum and vagina, it will in time probably push the posterior wall of the latter forwards and downwards. Hence there will be produced a swelling at the vulva; which is technically described as *vaginal enterocele*, or *entero-vaginal hernia*. Under such circumstances, the progress of parturition has been delayed by the intestine giving rise to an obstructing tumour which has had to be reduced. Necessarily there is a fear of intestinal obstruction or bruising taking place, either of which accidents might be followed by serious consequences.

All forms of vaginal prolapsus may occur either suddenly or gradually. Sudden displacement is due to anything which induces violent contraction of the abdominal muscles; so that the intestines are abruptly forced down upon the pelvic viscera. More frequently the extrusion takes place slowly and gradually; the vaginal walls being weakened by frequent parturition, by long-continued catarrh, by rupture or loss of tonicity in the perineum, and so on. Moreover, the prolapsed part is at first small; but this portion, like the thin edge of the wedge, serves gradually to secure greater and greater displacement.

The principal symptoms of prolapsus of the vagina are,—bearing-down pains, aggravated by exercise; feelings of weight and fulness and irritation about the vulva; and sensations of throbbing and heat and general discomfort throughout the pelvic viscera. Backache is always mentioned as being troublesome. The general health is never really good: the digestive organs are especially apt to be deranged.

When the whole circumference of the vaginal mucous membrane is prolapsed we find at the vulva a projecting tumour, the surface of which, if the descent be of long standing, is generally inflamed and indurated and more or less excoriated. As the fall of the anterior wall is usually the most complete, the opening leading up to the uterus is somewhat concealed at the lower and posterior part of the projecting mass; while on passing the finger up the passage, the os uteri is met with drawn more or less downwards. The functions of the bladder and rectum may be uninterfered with; although more frequently complaint is made of some irritability of the former viscus.

For the cure of displacement of the vagina which has occurred suddenly nothing more is necessary than the reduction of this organ, with the use for a few days or weeks of astringent pessaries (F. 423). The patient may be kept in bed for two or three days, as a matter of precaution, while care is necessary that the bowels act without any straining efforts being needed. In attempting to remedy either complete or partial prolapsus of the vagina which has come on gradually, it will be necessary to improve the general health; while such agents are administered as provoke muscular contraction, and impart tone to the tissues generally. A nourishing diet, the daily use of cold salt water hip baths, with such tonics as quinine and steel and strychnia (F. 380), or phosphoric acid and nux vomica and bark (F. 376, 414) will always prove useful. The tissues of the vagina can also be strengthened by the proper employment of astringent injections (F. 425), or of pessaries containing tannin and catechu (F. 423). Where there is prolapsus of the posterior wall of the bladder, care must be taken to prevent the undue accumulation of urine. The patient should be recommended to pass water every three or four hours, and before doing so to try and push up the protrusion. The catheter, however, must be employed, rather than allow of any decomposition of the retained secretion. Similarly, in cases of rectocele, the bowel ought to be carefully emptied at least once a day; a full evacuation being obtained by the administration of pills of colocynth or aloes and nux vomica (F. 175), or oft-times preferably by stimulating enemata (F. 190). Should the practitioner detect any excessive fæcal accumulation, it may be necessary, in the first instance, to remove it with the scoop.

Abdominal belts, made so as to prevent the viscera from pressing on the pelvic organs, can often be worn with benefit. Now and then it is advantageous to have a perineal band affixed to the belt; especially where the prolapsus has been of such long continuance that the structures about the vulva have become much relaxed. Vaginal pessaries, whether they consist of elastic air bags, or rings or levers, or globes of wood, are seldom to be recommended. They may perhaps act beneficially for a short time; but their ultimate effect will be to aggravate the evil instead of removing it.

For severe cases of prolapsus without any rupture of the perineum, an operation is often practised to diminish the size of the vaginal outlet. As the subject is referred to in the section on procidentia uteri, I need only here say that I have but little confidence in its efficacy. Moreover, I do not recollect having seen any instance where it has appeared necessary to lessen the calibre of the vaginal canal by dissecting off one or more strips of the mucous membrane, and bringing the edges together with interrupted sutures; although in any exceptional instance, when other remedies have failed, this proceeding might doubtless be resorted to with advantage.

Finally, where there exists a *rupture of the perineum*, surgical treatment proves invaluable. This accident results from parturition; the tear occurring in consequence of an excessive disproportion between the size of the fœtal head and the maternal outlet, or owing to the employment of instruments—especially the forceps. Under either circumstance the practitioner may be blameless; for in certain instances rupture will happen in spite of the greatest skill, and of the most unwearied attention. The injury will vary in degree; the rupture only involving the fourchette and part of the perineum, or extending up to the sphincter ani, or going completely through this muscle, or tearing the sphincter and part of the recto-vaginal septum. In all these grades there is a subsequent tendency to prolapsus of the vagina, with cystocele or rectocele; to procidentia of the uterus; and to excoriations about the labia uteri, with leucorrhœa, &c. But when the sphincter ani is injured, then (in addition to the foregoing evils) there will be more or less inability to retain the intestinal gases and stools; the latter coming away involuntarily whenever there is any approach to diarrhœa. The misery caused by this misfortune can easily be estimated. Fortunately, however extensive the laceration, a cure can be promised; though it does not follow that success will always attend the first attempt. A great deal depends on the patient being prepared for the proceeding by having the intestinal canal thoroughly cleared out, as well as upon her composure and quietude for several days after the operation. Briefly described, this may be said to consist in completely denuding the surfaces of the cicatrix, as well as the tissues just above them; and in then bringing them into close and firm apposition by the clamp or quill suture, with superficial sutures of silver wire. Where the sphincter ani has been torn through, this structure should be divided on both sides (as recommended by Mr. Baker Brown) before inserting the sutures; but in other cases such a proceeding will be unnecessary. During the after-management the patient is to lie quietly on a water-bed; the bladder is to be emptied by the catheter every six or eight hours, for the first eight days; the bowels are to be kept confined until adhesion is perfect; and the occurrence of pain and intestinal action must be prevented by the administration of opium. The deep sutures are to be withdrawn at the end of forty-eight hours, and the superficial ones about the seventh day. The diet throughout should consist of plenty of milk, raw eggs, wine, and mutton or poultry. Attention must be paid to quantity as well as quality: if we give too little food the surfaces of the perineum will probably not unite kindly; if we allow too much, we shall be encouraging the formation of a large and hard stool, which may very likely tear asunder the newly-joined tissues when it comes away.

V. DISEASES OF THE BROAD LIGAMENT.

The diseases now to be described have been included under the above heading in deference to the authors of the Nomenclature of Diseases adopted by the Royal College of Physicians. For with the exception of certain cystic degenerations there is not one of the following affections the seat of which is limited to, or even chiefly connected with, the broad ligaments. The morbid action is linked with the uterus and its appendages—the tubes, ovaries, and broad ligaments. The starting point of the mischief is usually from the inner surface of the uterus, or from the ovary, or from the oviduct; and not simply from those folds of peritoneum and connective tissue between them, which together constitute the broad ligament. However, with reference to all these diseases it must be recollected that our knowledge is at present in a rudimentary state; and consequently many of the observations which follow may have to be modified by and by, as our opportunities for investigation and comparison have become multiplied.

1. PELVIC CELLULITIS.

Inflammation of the abundant loose cellular (connective) tissue in connexion with the uterine appendages is a very important disease, our knowledge of which has been much increased by recent investigations. Its principal synonyms are *pelvic abscess, parametritis, peri-uterine phlegmon, inflammation and abscess of the uterine appendages, inflammation of the broad ligaments, &c.* The designation "pelvic cellulitis" is to be considered in the light of a convertible term with "parametritis" as employed by Virchow, Duncan, &c.; just as "pelvic peritonitis" is synonymous with "perimetritis." Dr. Matthews Duncan, in his work just published (1869) "On Perimetritis and Parametritis," distinctly confines these terms to the signification of inflammation and abscess in connexion with uterine, tubal, and ovarian disease. By "perimetritis" he strictly implies inflammation of the uterine peritoneum: by "parametritis" he means inflammation of the cellular tissue in connexion with the uterus.

The inflammation is necessarily seldom limited to its primary seat. The mischief spreads to the adjoining textures, and probably by direct continuity of tissue; just as acute morbid action is very frequently propagated in other parts of the body.

Causes.—Pelvic cellulitis occurs most frequently after parturition at the full term, or after abortion; or it may be originated by dilating or cutting or cauterizing operations on the uterus, or by the abuse of the uterine sound, or by excessive sexual intercourse, or by gonorrhœal or syphilitic or malignant disease, or by acute or chronic ovarian or uterine affections. Gestation, whether abruptly and prematurely terminated, or carried on to the full term, is the cause of probably two-thirds of the cases of this disorder which are met with. The important point, however, is this—pelvic cellulitis seldom, if ever, happens except as a secondary disease. It may be said not to occur after the change of life. In one case under my care it did so, but only as the consequence of mischief set up by the removal of an intra-uterine fibroid.

Puerperal pelvic cellulitis is of much more common occurrence in primiparæ than in multiparæ; and the longer the duration of labour, the greater appears to be the liability to it. A depressed state of health prior to parturition, and the setting in of hæmorrhage during this process, also predispose to it. In some epidemics of puerperal fever there has appeared to be an unusual tendency to inflammation and abscess of the uterine appendages; though it must be remembered that the form of inflammation under consideration may happen quite independently of puerperal peritonitis or metro-peritonitis. There is no essential difference between puerperal and non-puerperal cellulitis: the morbid action, however, runs a more rapid course in the former than in the latter, perhaps owing to the effect of that remarkable series of changes in the uterus, which commences directly after parturition.

Pathology.—There is an abundance of loose connective tissue in the pelvis; especially between the broad ligaments, between the vagina and rectum, between the uterus and bladder, as well as about the psoas and iliacus muscles. Beneath the peritoneum investing the fundus and upper three-fourths of the front and back of the body of the uterus there is only the merest trace of connective tissue: in fact, so difficult is it to demonstrate the presence of this tissue in these parts, that some authors deny its existence there.

Inflammation attacking the connective tissue of the uterus runs the same course as inflammation elsewhere. The disease will be extensive or partial. Starting from the uterus, the morbid action may spread widely. Thus, the whole of the cellular tissue and peritoneal lining of the pelvis is sometimes involved; or the connective tissue between the folds of one or both broad ligaments will be affected; or the inflammation may be limited to the tissues between the uterus and bladder, or to those between the uterus and rectum.

The disease may end in resolution, and leave no trace of its having been present; or it may subside favourably, though it causes long-persistent thickening and induration of the affected tissue, with immobility of the uterus; or it will perhaps terminate in suppuration—pelvic abscess. Except where the inflammation is connected with puerperal fever, the great majority of the cases recover; although where suppuration takes place, the restoration to health will be very slow.

Symptoms.—Occasionally this disorder comes on very insidiously with mere weakness; so that its existence is not suspected until there is found considerable swelling about the pelvis or the lower part of the abdomen, and when the tissues about the uterus and broad ligaments have got indurated and perhaps matted together. More frequently, however, there is marked constitutional disturbance at the onset. The pulse rises in frequency, and the countenance becomes anxious. There is more or less fever, backache, loss of appetite, restlessness at night, and a sense of pelvic weight and bearing-down; together with local pain and throbbing and tenderness. An aching of the limbs is often complained of, especially about the upper part of the thighs. There may either be frequent or difficult micturition, or attacks of tenesmus; one or other prevailing according as the tissue in front of, or behind, the vagina is involved. In some of the instances which have been under my care there has been very troublesome irritability of the stomach, inducing frequent vomitings of fluid or mucus tinged with bile. At the end of about forty-eight hours, a proper examination will always detect the presence of a puffy and sensitive condition of the vaginal walls; while a little later the affected connective tissue can be felt in a state of induration and thickening. If the tissue of the broad ligaments be the part inflamed, this hardening and swelling may possibly be perceptible at the lower region of the abdomen; but where the morbid action is confined to one side of the uterus, or to the vesico-vaginal or recto-vaginal septum, an internal examination must be made to discover it. This tumefaction is probably the result of œdema of the connective tissue.

Pelvic cellulitis often terminates by resolution in the course of fourteen or twenty-one days. This, however, is not so likely to happen when the disease has ensued upon pelvic peritonitis, or on endometritis, or ovaritis, or inflammation of the oviduct. Supposing that the inflammation runs on to suppuration—to the production of pelvic abscess, the local and constitutional distress will be found to increase in severity. The general symptoms of pelvic abscess very much resemble those produced by suppuration in other organs. There are chills or rigors, fever and sweating, sleeplessness, great thirst with loss of appetite, and both mental and bodily depression. In addition, there is severe throbbing pain about the pelvis; with more or less irritability of the bladder and rectum. By combining a vaginal examination with abdominal palpation a peculiar elastic tumour will be felt, or possibly only a general fulness and œdema of the tissues.

A pelvic abscess may open into the rectum or vagina, or through the abdominal walls, or into the cavity of the peritoneum, or into the bladder. The opening into the rectum is the most common. While the pus is being alternately discharged and re-secreted pregnancy may possibly occur, and prove a very serious complication.

Diagnosis.—Pelvic cellulitis is only likely to be seriously confounded with an inflamed fibroid tumour of the uterus, an inflamed ovary, an extra-uterine pregnancy, and pelvic hæmatocele. From the first I know not how it can well be distinguished; and it seems to me that our only hope of avoiding error is by recollecting that inflammation of fibroids is a rare occurrence, while it very seldom happens without the presence of such a growth having been previously determined. A fibroid uninflamed cannot possibly be mistaken for an acute phlegmon.—An inflamed ovary presents many symptoms like those set up by cellulitis. However, in the latter the swelling is more extensive, and the pain much less severe and less localized: there is a great difference between the loose connective tissue, and the unyielding and firm fibrous capsule of the ovary. Ovaritis, moreover, very rarely ends in suppuration.—In extra-uterine fœtation the symptoms come on very gradually, the catamenia are usually suspended, the breasts enlarge and the areolæ darken, while there is only slight tenderness about the cervix uteri. Of course, if the gestation be advanced the fœtal heart will be heard. The abdominal pains are severe, but they come on irregularly, continue only a short time, and then temporarily cease.—Pelvic hæmatocele produces suddenly a soft and comparatively painless tumour, without fever, and without heat and swelling of the vaginal walls, but subsequently the blood coagulates and the tumour becomes hard. Local peritonitis sets in subsequently. The hæmorrhage often occurs at a catamenial period, especially when there has been suppression of the flow for some previous occasions. The symptoms generally point to depression from loss of blood, rather than to inflammatory excitement. An exploratory puncture with a fine trocar and cannula can at most times be made without risk to clear up any doubt. May be, however, the blood which has been poured out has undergone a kind of suppuration, and then there will be all the indications of a pelvic abscess.

Prognosis.—Caution is necessary in giving an opinion as to the duration and mode of termination of this disease. The inflammation is apt to spread insidiously; and when all seems to be going on well, a slight cause may again light up the mischief. As a general rule, experience justifies our looking for recovery ultimately.

Treatment.—In the early stages, when there is a hope that the inflammation may end in resolution, the practitioner should beware of resorting to very active treatment. The evil will probably be increased by the use of general bleeding, or of strong purgatives. But if the pain and throbbing be very distressing, a few leeches may be applied to the lower part of the abdomen, or around the anus, or even to the seat of fulness in the vaginal wall; while a dose of some mild aperient can be administered if the bowels have become confined. The remedies, however, in which I have the most confidence are,—the application of linseed poultices or poppy fomentations; the use of vaginal pessaries containing the extracts of belladonna and conium (F. 423), with mercurial ointment if there be any evidence of a syphilitic taint; the employment every eight or twelve hours of the officinal opiate enema, or of the subcutaneous injection of morphia (F. 314); together with complete rest in bed. If there be much abdominal tenderness, relief will be more effectually given by covering the part with a mixture of the extracts of belladonna and poppies (F. 297) and a linseed poultice, than by simple fomentations. Hot hip baths, with hot water vaginal injections, are very soothing and agreeable; but the patient should keep as quiet as possible in the recumbent posture, while the bath and injection require more exertion than can well be borne during the acute stage of the inflammation. Support must be given in the shape of milk, raw eggs, arrowroot, broth, beef tea, &c.; while any irritability of stomach which may be present will be best relieved by the application of a sinapism over the epigastrium, and by allowing a free supply of ice.

As soon as the acute symptoms have subsided, some authorities recommend the application of blisters over the hypogastrium, together with the administration of full doses of iodide of potassium, in order to procure absorption of the effused materials. I have, however, no confidence in the efficacy of these remedies to produce the desired effect; while I am also of opinion that such a line of practice is very likely to cause suppuration. We may depend upon it that when a case of this kind is doing well, the less we interfere by active treatment the better.

Where the disease advances to suppuration, wine and tonics will be required in addition to the foregoing. The question as to the necessity for operative interference will be discussed presently.

2. PELVIC PERITONITIS.

Inflammation of the peritoneum covering the uterus and its appendages is not to be confounded with general peritonitis. The form of peritoneal inflammation now to be considered is strictly limited to the pelvis. Its synonyms are *pelvi-peritonitis*, *metro-peritonitis*, *perimetritis*, &c. The disease has mostly been confounded with pelvic cellulitis, from which it differs in many important points,—just as pericarditis differs from carditis, pleurisy from pneumonia, and meningitis from cerebritis.

Causes.—The causes of inflammation of the serous membrane covering the uterus and other pelvic viscera are pelvic cellulitis, metritis and ovaritis, inflammation of the oviducts, parturition at the full term or premature labour, mischief set up by operative proceedings, injections into the uterine cavity, and gonorrhœa or other irritating discharges passing into the uterus; as well as most of those circumstance which interfere with the healthy performance of the menstrual functions, or which excite tubo-ovarian disease.

Pathology.—As elsewhere happens, the inflammation at first produces congestion and redness, with harshness and dryness of the affected tissue. Next, there is swelling and immobility of the uterus and its appendages owing to the exudation of plastic lymph and serum. And then lastly, there is either absorption of the serous fluid, or the mischief extends in violence till it ends in suppuration; while the exuded lymph gets organized, and by its contraction binds the uterine organs together almost like a tumour.

Symptoms.—These will vary according as the disease is acute or chronic. In the former there is generally chilliness followed by pain. Often the suffering is slight, merely fretting the patient: now and then it is unendurable, causing involuntary cries or shrieks. The more sudden and rapid the action of the exciting cause, the greater will be the intensity of the pain. There is always a marked amount of tenderness about the hypogastrium, increased by pressure. The skin is hot, the pulse frequent, and the countenance anxious. There is backache, with pains down the thighs: neither of these symptoms, however, are as constant or severe as in pelvic cellulitis. Oft-times there are excessive nausea and vomiting; while as a rule there is tympanites with constipation. Moreover, all the symptoms are aggravated by the menstrual molimen, especially if the flow be obstructed or scanty. A vaginal examination, made at an early stage, detects increased sensibility about the cervix as well as about the recto-vaginal space. After a short time the uterus is found quite immobile, with the roof of the vagina hard and unyielding and stretched; while subsequently, the uterus and its appendages give the impression of being glued together into a kind of solid and sensitive tumour. Moreover, the uterus is either in part or completely displaced: perhaps only the fundus is drawn backwards and downwards, causing an irreducible retroflexion. When pus is formed, the abscess may push the pelvic viscera almost anywhere. Suppuration, however, is much more infrequent than in pelvic cellulitis.

In the chronic variety the symptoms may be so slight as to pass away without their import being correctly diagnosed. The patient is thought to be hysterical; while her pains are vaguely said to be neuralgic. The results are serious, however; especially in causing uterine and tubo-ovarian disease or displacement, and in binding the different intra-pelvic structures together with coagulable lymph. The adhesions may later become the cause of intestinal obstruction from a coil of intestine finding its way into a ring thus formed. Menstruation becomes attended with great suffering; while in the event of pregnancy an abortion is likely to happen, or failing this there will be considerable pain and more than usual sickness during the early months. The catamenia may, however, permanently cease; and then of course there will be irremediable sterility.

Terminations, &c.—The duration of pelvic peritonitis varies much in different cases: it may run its course in three or four weeks from the onset, or it may continue for even a few years. Supposing suppuration to occur and the pus to be discharged by the rectum, there will perhaps be a complete cure; but the opening may close although pus continues to be secreted, and then there will be rigors, night sweats, debility, pain, loss of appetite, &c., until the purulent matter again escapes. In these cases of long-continued suppuration, albuminuria (owing to amyloid degeneration of the kidneys) may by and by follow and ultimately prove fatal. So also the cachectic condition induced by pelvic peritonitis now and then causes tubercular phthisis.

Prognosis.—Seeing the dangerous nature of this disease in its early stages, as well as the grave results which will possibly follow it, the practitioner should be somewhat reserved in speaking of the result. Many cases recover completely; but often only after suffering from dangerous complications, and perhaps from several monthly relapses. Where the inflammation follows upon parturition or abortion the danger to life is considerable.

Treatment.—The important remedies are,—perfect rest in bed; the administration of opium in doses sufficient to relieve pain; and the application of heat and moisture by means of large linseed poultices over the hypogastrium. Applications by the vagina had better be avoided; but if they be employed they must consist only of pessaries containing opium and belladonna. I have known even emollient injections increase the pain; while in one instance a cold vaginal douche is said to have rendered the peritonitis fatal. All aperients are to be forbidden; for though it is a misfortune to have fæcal matter in the intestines, yet there is too much risk of aggravating the inflammation by the powerful action of cathartics. If the rectum be loaded, however, three ounces of warm olive oil with one of castor oil may be injected, and retained as long as can be conveniently managed. Where there is pain or difficulty in emptying the bladder, the catheter should be employed. The diet must consist of milk and broths, with raw eggs and refreshing drinks. Ice ought to be allowed, as it allays the irritability of the stomach. Unless there be suppuration alcoholic stimulants do harm.

After an attack of pelvic peritonitis care will be needed for some time to prevent any relapse. During the four or five subsequent menstrual periods the patient should remain in bed, since these occasions are always critical. Again, if there be any leucorrhœal discharge attempts are not to be made to check this by astringent injections or pessaries. Over-fatigue is always to be guarded against. A well-made abdominal belt, by supporting the viscera instead of allowing them to press upon the pelvic organs, often gives considerable relief. Nourishing food, cod liver oil, and a long stay at the seaside are valuable allies in getting a complete restoration to health.

3. PELVIC ABSCESS.

Suppuration occurs within the pelvis as a consequence of pelvic cellulitis with greater frequency than from any other cause. It may also happen from pelvic peritonitis; from inflammation of the walls of an ovarian cyst, or of an extra-uterine pregnancy, or of the structure of a fibroid tumour of the uterus; as well as from degeneration of the blood poured out in a case of hæmatocele.

Whatever the cause of the suppuration may be, the *symptoms* will generally be well marked. Thus, there are chills or distinct rigors; attacks of hectic fever, with night sweats, and sleeplessness; and pains about the pelvis, with great throbbing and tenderness. Bodily weakness and mental anxiety are marked features in these cases. Neuralgic pains, extending down the thigh of the affected side are complained of; and pains about the sacrum are wearying. On making a vaginal examination, a sense as of touching a thin-walled cyst full of fluid will be communicated to the finger, provided the abscess be pressed low down, and be not altered in character by the pressure of some fibroid or other tumour upon its walls. In a very few instances fluctuation can be detected by alternately quickly pressing and ceasing to press just under the pubic arch, while one finger of the other hand is applied to the swelling in the vagina. The uterus is also more or less fixed, and at times displaced. The abscess spreads in all directions; and there is scarcely any limit to the size it may possibly attain. I have removed upwards of two pints of pus from one abscess.

After a time, the wall of the abscess may often be felt to be getting thin at one point; indicating the situation at which the contents will probably be evacuated. Although the pus is generally discharged into the rectum or into the upper part of the vagina, yet very rarely it makes its exit into the peritoneal cavity (setting up severe, but not necessarily fatal, peritonitis), or it is discharged into the bladder, or it burrows and makes its escape externally at one or other groin. Where the abscess opens into the rectum or vagina, the sac may become obliterated and the patient soon get well. But, unfortunately, in not a few instances the matter is re-secreted, to be once more discharged at the same spot as before; this process being repeated again and again, until the health becomes much reduced. Nevertheless, steady perseverance with proper remedies can often at last effect a cure; so that in no instance of this kind should the patient or the practitioner despair. The most troublesome cases to manage are those where the pus burrows, and escapes at different times by different openings. In such, very obstinate sinuses remain which are healed with great difficulty; while if they communicate, as they ultimately are likely to do, with the bladder and rectum, a distressing state of disease will result. In this way there may be fistulous openings about the anus, vulva, groins, or lower part of the abdomen; through all of which offensive pus and urine and fluid fæces will be discharged. If one or two of the wounds close, they generally only do so for a time; or if we succeed in firmly healing some of the sinuses, it will probably be at the expense of aggravating the others. A lady who was under my care for nearly two years with small abscesses which burst into the rectum every six or eight weeks, unfortunately became pregnant before a thorough cure could be effected. The consequence was the formation of a large quantity of pus, which burrowed about the loose areolar tissue in all directions; while her sufferings were so great and constant that it became necessary to induce premature labour at the seventh month. Great relief followed the birth of the child, and under the influence of sea air and tonics, &c., the health improved considerably; but the sinuses never showed any disposition to heal, while the abundant irritating discharges which were poured from them, produced, at length, fatal exhaustion.

The *treatment* of pelvic abscess has to be conducted on those well-recognised principles which guide us in the management of disease which has gone on to suppuration in other organs. There are few if any exceptions to the rule that nourishing food and wine and tonics are required. Good claret, or carlowitz, or ofner, or tokay, or St. Elie (an excellent restorative Greek wine), or red Australian wine, or port, or brandy and soda water, &c., may be prescribed; the choice from among these depending on the state of the stomach as regards acidity and retching. Milk, cream, strong beef tea, soup, and jellies should be ordered; followed by white fish, mutton, poulty, game, roast beef, and so on, as soon as the stomach appears strong enough to digest animal food. With regard to drugs no remedies are better than ammonia and bark (F. 371); for which quinine and one of the mineral acids (F. 379) had better be substituted at a later stage. Cod liver oil does good if it can be assimilated. Where the suffering is severe most relief will be given by the subcutaneous injection of morphia (F. 314). If there be peritonitis, opium in repeated doses ought to be trusted to.

Locally, soothing fomentations, hot and large linseed poultices, and repeated hot hip baths will of course be had recourse to. The most important question, however, is as to the advisability of surgical interference; upon which point there is a difference of opinion. Some authorities recommend exploratory punctures, followed by incisions, where there is the smallest indication that pus is present. Others, on the contrary, assert that the abscess is not to be opened, but that it is to be allowed to burst spontaneously. My own experience leads me to acquiesce in the soundness of this last principle, unless the pus is evidently near the surface—as when there is pointing in one or other groin, or distinctly in the vagina, &c. With the object of preventing the re-formation of the pus after the contents of the abscess have been evacuated, it would seem advantageous, theoretically, to resort to pressure. To apply this efficiently, however, is by no means an easy task; while frequently there is so much tenderness that no pad and bandage can be borne. I have tried more than once to fit an india-rubber bag, filled with air, just above the pubes, maintaining pressure by means of a kind of truss-spring; but the apparatus could only be worn for a few hours at a time, and no benefit resulted.

4. CYSTS OF THE BROAD LIGAMENT.

Thin and single membranous cysts, of variable size, are sometimes found attached to the broad ligament; or such cysts become developed between the layers of the ligament, or they seem to grow from the fimbriated extremity of the Fallopian tube. Probably the most frequent variety of cyst originates in the remains of one of the little tubules of the parovarium or Wolffian body. Such a cyst does not usually attain a greater size than that of the closed fist; although every now and then a larger one will be met with. Thus, in a case successfully operated upon by Mr. Spencer Wells, under the idea that the tumour consisted of a nearly unilocular ovarian growth, the cyst was proved to have its origin in the broad ligament, and to be about twice the size of an adult head. The ovary was healthy and in no way connected with the cyst.* It seems to me very probable that some of the cases of supposed unilocular ovarian tumours which have been cured by tapping, have in reality been examples of cystic disease of the broad ligament. The fluid from these cysts is transparent, free from albumen, and somewhat resembles limpid urine in appearance; while that from an ovarian tumour is always more or less albuminous, and is very seldom translucent. The removal, by abdominal section, of a cyst having its origin in the broad ligament can never be justifiable until simple tapping has failed to effect a cure. Even then it is unnecessary to do more than expose the cyst, empty it, and excise a small portion of its walls; so that any fluid which is afterwards secreted may escape into the peritoneum, whence it will become absorbed without exciting inflammatory or other serious symptoms.

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* *Diseases of the Ovaries: their Diagnosis and Treatment*, vol. i. p. 240. London, 1865.

5. PELVIC HÆMATOCELE.

The fact, that an effusion of blood may take place upon or beneath the peritoneum in the immediate neighbourhood of the uterus and its appendages, has attracted much attention for some time past; for although a few examples of this accident may have been described upwards of two centuries ago, yet it was practically unknown until a comparatively recent date. The tumour formed by the effused blood is known as a *sanguineous pelvic tumour*, or as *ovarian apoplexy;* though it is now more commonly described under the designation of either *retro-uterine, peri-uterine,* or *pelvic hæmatocele* [Αἷμα = blood + κήλη = a swelling]. In France, especially, many valuable essays have been published on this disease since the year 1831, when Recamier gave the history of a case which had been under his care. It was not, however, until 1850 that Vigués attempted to collect and systematize the different features and symptoms presented by these sanguineous pelvic tumours; while to Dr. Tilt we are indebted for having, towards the end of 1852, first brought the subject before the profession in this country.

Causes.—Any condition which interferes with the normal performance of the menstrual function, and especially such as impedes the due discharge of this secretion, must be regarded as a prominent cause of pelvic hæmatocele. Hence this accident almost always occurs at a catamenial period; while it is most common about the age of 30, when the sexual organs are in their greatest vigour. The sudden suppression of the monthly flow, excessive mental excitement or bodily exertion during the period, intemperate coition, and external injuries are likely to induce the form of hæmorrhage under consideration. Dr. J. Byrne of New York believes that in 80 per cent. of the cases there will be found unmistakeable evidence of ovaritis; which in time produces a varicose condition of the vessels, a softening possibly of the gland tissues, a modification of the nervous stimulus, and ultimately rupture with extravasation.

Pathology.—The disease consists of an effusion of blood into the peritoneal pouch between the uterus and rectum, or into the sub-peritoneal tissue behind and around the uterus. The latter is the least dangerous form, as the effusion is generally small; and therefore it may be wrong to infer that it is by no means of such frequent occurrence as the first kind, because post-mortem examinations rarely show its presence. According to M. Bernutz it is only met with during pregnancy or the puerperal state; but this opinion has not been confirmed by other observers. In the former or intra-peritoneal variety, the blood has now and then been discharged so abundantly as to fill the entire abdominal cavity; although more frequently the extravasation will be found limited to the recto-uterine cul-de-sac, being generally confined there by the effusion of coagulable lymph with the formation of adhesions. Hence the danger is decidedly greater in the non-encysted than in the encysted cases.

The blood may be poured out from various parts. Thus, it can escape from the ovary at the time of menstruation if this organ be diseased, or if it be the seat of inordinate congestion. It may come from one of the Fallopian tubes owing to the rupture of its wall; or in consequence of a reflux of the sanguineous exhalation which takes place from its mucous lining during a catamenial period; or it will happen as the result of a retrograde flow from the interior of the uterus when the os uteri is obstructed. Rupture of one or more of the vessels of the utero-ovarian venous plexus, or of a varicose vein in the broad ligaments, or of the vessels in the cyst of an extra-uterine fœtation has been its source. Hæmorrhagic peritonitis will perhaps produce it; and so may that exhalation of blood which is sometimes met with in chlorosis, as well as in purpura and scurvy. And lastly, the effusion may be one of the effects of a general and excessive congestion of the reproductive organs, such as is the cause of some forms of menorrhagia; especially if this congestion have any connexion with the hæmorrhagic diathesis.

Symptoms.—The symptoms will vary according as the escape of blood is large or small. Where the flow is excessive there will be indications of nervous shock, as well as of exhaustion from internal hæmorrhage. The patient is suddenly seized with acute pain in the lower part of the abdomen; while there is chilliness or shivering, coldness of the extremities, vomiting, increasing feebleness of the circulation, and a ghastly expression of the countenance. The suffering resembles that produced by rupture of one of the abdominal viscera. Death usually occurs in the course of two or three hours.

In a second set of cases the loss is great but not inordinate. There is violent abdominal pain, tympanites, sickness, and chilliness followed by fever. A sense of pelvic weight is common, with bearing-down pains. The face becomes pinched and pale, and the countenance anxious. Sometimes, but by no means always, there is either difficult micturition with a frequent desire to empty the bladder, or a painful irritability of the rectum. If the catamenia be present at the time of attack they may suddenly cease, or the flow may continue unaltered, or the discharge may even be greatly increased. On examining the lower part of the abdomen, a smooth and elastic swelling will be found in the hypogastric or iliac regions; while on introducing the finger into the vagina, a large tumour will be felt pressing upon this canal. If the finger be passed onwards, the cervix will be discovered drawn upwards behind the symphysis pubis; but we shall not be able to trace the body of the uterus stretching backwards, as it can be detected in cases of retroversion. On examining by the rectum, the passage of the gut will be found more or less obstructed by the swelling which has been previously detected in the vagina.

The symptoms presented by a third class of cases resemble the foregoing, save that they are less acute. Possibly no tumour can be detected by an abdominal examination, though a well-marked vaginal swelling will be present. Most of these cases do well; although there is a fear of the peritonitis which ensues extending upwards, or of a second attack of hæmorrhage setting in just as recovery is taking place from the first seizure.

To distinguish between intra-peritoneal and sub-peritoneal hæmatocele it may be remembered that in the former the tumour is generally higher (extends more up into the abdomen) than in the latter; while there is greater disturbance of the system, and a more rapid setting-in of peritonitis in the peritoneal than in the extra-peritoneal form. It is rather remarkable, however, that little aid in arriving at a conclusion can be obtained from a vaginal examination; for although theoretically it would seem probable that blood under the peritoneum would press against the vagina and uterus, and so cause displacement much more than an effusion into the peritoneum could, yet in practice it is found that the same results ensue from the blood gravitating in the cul-de-sac between the vagina and rectum.

Diagnosis.—As the recognition of this disease is a matter of recent date, it follows that the symptoms it produces must formerly have been erroneously attributed to other disorders. Cases illustrative of such mistakes, occurring even since 1850, have been recorded; while probably before this time practitioners prided themselves on the correctness of their diagnosis when they classed examples of this affection under the heads of dysmenorrhœa, or of anæmia, or perhaps of those convenient refuges for the destitute—spinal irritation and hysteria. The chief diseases with which pelvic hæmatocele is likely to be confounded, are pelvic abscess, extra-uterine fœtation, retroversion of the gravid uterus, fibroid tumours of the uterus, and ovarian cysts.

Considerable difficulty will often be experienced by the most painstaking physician in distinguishing between pelvic abscess and an effusion of blood; for in each there may be local peritonitis, constitutional disturbance, and a pelvic tumour. But the peritonitis sets in after the formation of the tumour in hæmorrhage, instead of preceding the suppuration; while the heat and tenderness about the vaginal walls are much less in the former than in the latter. Nevertheless, where the history of the case fails to throw light upon its nature, and it seems necessary to be exact, the diagnosis must be established by the use of a fine trocar and cannula; just as we employ the exploring needle in doubtful growths at the surface of the body.

With regard to extra-uterine fœtation it may be remembered that the patient usually believes herself to be pregnant, and she experiences the usual symptoms of this condition. The menses have generally ceased. The practitioner is seldom consulted until the fœtus has acquired such a size that its presence can be determined; until indeed rupture of the cyst takes place with abundant hæmorrhage, and then the case as regards treatment may be mistaken for hæmatocele from other causes without any injury to the patient.

In retroversion of the uterus, the position of the os uteri under the pubes, and the possibility of tracing the body of the uterus thrown backwards, point to the nature of the accident.—It would seem impossible to mistake a solid fibroid tumour of the posterior wall of the uterus for a blood-coagulum, did we not know that in one instance an eminent surgeon made free incisions to enucleate a supposed fibroid, and only discovered his mistake too late; while on another occasion the autopsy disclosed the hæmatocele, though the case had been lectured upon as affording a good example of a common uterine tumour.—An ovarian cyst could only be mistaken for a blood-swelling, if the former were small and were confined by adhesions to the peritoneal pouch, between the uterus and rectum. An exploring needle would remove all difficulty, if interference were demanded.

Terminations.—The patient may die outright from the severity of the nervous shock; or from the loss of blood where the hæmorrhage is great, or where one attack of bleeding is followed by a second. The effused blood may become absorbed, and complete recovery follow. The blood will now and again be discharged into the bowel, and escape per anum; the ulceration between the blood cavity and that of the rectum ultimately healing. It has been suggested by Dr. Willoughby F. Wade of Birmingham that a cure is sometimes effected by the effused blood finding its way through the Fallopian tubes into the uterus, and thence into the vagina; and he thinks that in those cases where it has been supposed that the escape has been by a rupture of the vaginal wall, the blood in reality has passed along the oviduct. The blood cyst and its contents can undergo suppuration; recovery perhaps ensuing after protracted suffering and the discharge of sanious pus by the rectum, or death taking place from exhaustion. And lastly, the patient may die from the peritonitis which is set up by the effusion, especially where the inflammation spreads and involves the whole serous membrane.

Treatment.—In those formidable instances where the patient is apparently dying from the loss of blood, the only hope of saving life is from the free exhibition of stimulants and essence of beef, with full doses of opium. The use of sinapisms to the extremities, and the application of bladders of ice to the lower part of the abdomen and the vulva may be of some assistance.

But fortunately these terrible cases are comparatively rare, and there is time to give the patient the benefit of a well directed line of treatment. The most perfect repose in the recumbent posture must always be enjoined, however slight the effusion may at first appear; for without quietude all else will most likely be useless. Opium is to be administered, in doses sufficient to prevent faintness, as well as to relieve the pain. Ice should be continuously sucked to stop the vomiting, while a sinapism may be laid over the epigastrium for the same purpose. Supposing there is reason to fear that the bleeding is continuing, strips of muslin wrung out of cold water or a bladder of ice should be laid over the lower part of the abdomen and vulva. If there be any difficulty in emptying the bladder, the catheter is to be employed; but unless the rectum be blocked up with fæcal matter it will be better not to administer any aperient. With regard to the necessity for surgical interference, opinions differ widely. It seems to me, however, quite certain that if the case be progressing favourably, it will be wise to leave well alone; for it is infinitely safer, by gentle means, to do all that can conduce to a sure though slow recovery, rather than to risk the patient's life by any attempt at a rapid and brilliant cure. The effused blood will in most instances gradually be absorbed, just as certainly as we find those sanguineous tumours disappear which are occasionally developed between the bones of the skull and the pericranium in new-born infants. At the same time, if the symptoms produced by the pressure of the blood are very distressing, or if they are causing increasing prostration, then it may be advisable to puncture with a trocar the most prominent part of the tumour, either through the vagina or rectum. Moreover, if we have reason to believe that there is not only blood but pus present, then recourse can be had to puncture. Sometimes it has been deemed of advantage to leave the cannula in the wound, or to introduce a gum-elastic catheter, so as to prevent too early cicatrization; while several authorities recommend the frequent injection of small quantities of tepid water to prevent putrefaction of the retained clots. These are proceedings, however, which I should be very loth to adopt. But whether an operation be performed or not, the treatment of pelvic hæmatocele, after the subsidence of the acute symptoms, ought to consist in the administration of bark with one of the mineral acids, in carefully avoiding exercise or excitement at too early a period, and in the use of a very nourishing diet. Especially should the patient's condition be watched at the two or three succeeding monthly periods; so that by keeping her very quiet throughout the flow, we may guard as far as possible against any undue congestion of the sexual organs.

VI. DISEASES OF THE FALLOPIAN TUBES.

The difficulty of recognising morbid states of the oviducts during life is considerable. Many of these states too are frequently not primary diseases but secondary; being such as result from pressure exerted by uterine or ovarian tumours, or by cancerous infiltrations of some of the pelvic viscera. Consequently the symptoms will usually be anomalous, and far from easy to interpret. The chief diseases of these tubes are inflammation, and stricture or occlusion leading to dropsy. The tubes may also become dislocated or displaced, passing (probably in company with the ovary) through the inguinal or femoral openings. Thus, a tumour extending from the inguinal region to the right labium has been found to contain the Fallopian tube of the same side. A fatal case of femoral rupture has also been reported where the sac contained the tube alone.

1. INFLAMMATION OF THE OVIDUCTS.

Although the Fallopian tubes may undoubtedly be attacked with acute or with chronic inflammation, I must confess that I have never been able to diagnose such affections. And it is very probable that the symptoms produced by them so closely resemble those set up by pelvic cellulitis and ovaritis, that they will generally be attributed to one or other of these diseases.

According to most authorities, the principal indications of *acute inflammation of the tubes*, or *salpingitis* [from Σάλπιγξ = a tube; terminal *-itis*], are deep-seated pelvic pains, with throbbing and tenderness about one or both groins; a sense of bearing-down on assuming the erect posture; together with heat of skin, a dry tongue, constipation, and rapidity of the pulse. In the *chronic* form, the secretion from the lining membrane is much increased; so that if the uterine orifice of the tube be patent there will be a leucorrhœal discharge. In rare instances, the morbid action has ended in ulceration or in suppuration; the pus accumulating in the tube like an abscess, if the uterine extremity of this tube has been rendered impervious. Under such circumstances, death has occurred from peritonitis set up either by the pus regurgitating into the sac of the peritoneum, or by its leading to perforation of the walls of the canal.

2. TUBAL DROPSY.

Dropsy of the Fallopian tube is rather an uncommon affection. The fimbriated extremity of this canal, together with the uterine orifice, occasionally gets obliterated from the action of chronic inflammation, or from the pressure of various pelvic tumours.

In such a case the portion of the tube between the openings is very apt to become the seat of an accumulation of pus or of serous fluid; and instances are recorded where an hypertrophied Fallopian tube has alone weighed seven pounds, and has contained twenty-three pints of fluid. The diagnosis of this disease from a simple ovarian cyst is exceedingly difficult, and can only be guessed at in most instances. We can make sure the affection is not uterine where we find an elongated and yielding and fluctuating tumour at the side of the uterus, while this latter organ is able to be separated from the swelling by using the sound. In the museum of the Royal College of Physicians is a preparation, presented by Dr. Francis Hawkins when physician to the Middlesex Hospital, illustrative of dropsy of both Fallopian tubes; the extremities of these canals being all closed.—The Hunterian Museum also contains a preparation (No. 2643) showing a section of a womb having a fibrous tumour in its fundus, and with the fimbriated extremity of one Fallopian tube turned round and closely glued to the side of the uterus; so that in consequence of the closure of both extremities of the tube, fluid has collected in the canal and distended it into an elongated pyriform sac.

The treatment of tubal dropsy, where the suffering is sufficiently severe to require interference, consists in puncturing the cyst with a minute trocar and cannula through the roof of the vagina. Medicines given with the intention of producing absorption are quite useless.

The Fallopian tube may probably become distended with *blood* in cases where the escape of the menses is prevented by an imperforate os uteri, or by some obstructive disease about the vagina. The menstrual fluid being partly produced by the lining membrane of the oviducts, it must distend these tubes when its onward flow is impeded. After the distension has reached a certain point, it is very probable that the blood will escape at the fimbriated extremities of the tubes; and dropping into the peritoneal cavity, will thus give rise to peri-uterine hæmatocele.

VII. DISEASES OF THE UTERUS.

The greater number of women in this country begin to menstruate between the 14th and 16th year, the time at which this phenomenon is manifested being spoken of as the age of puberty. Not unfrequently a girl will menstruate once about the time she is 14, and then see nothing more for eight or twelve or fifteen months, after which all will go on naturally. For rather more than thirty years the flow recurs every twenty-eight days, calculating from the beginning of one period to the commencement of the next; while the duration of each period varies from three or four to seven days. Between the age of 45 and 48 years the discharge finally ceases; the date of this cessation being known as the last menstrual climacteric, or the change of life. Sometimes this occurs five or six years earlier, owing to some shock to the system. Thus I have known a permanent cessation take place at 37, in consequence of an attack of typhus, the patient nevertheless enjoying good health and continuing strong at 65. I have seen the same thing happen at the age of 32, as the result of a severe attack of rheumatic fever with endocarditis. Doubtless other disorders affecting the whole system now and then act in a similar manner.

During the years which intervene between the age of puberty and the change of life, there are few diseases of the generative system which are not attended with more or less disturbance of the catamenial functions; and hence either deficient, or painful, or profuse menstruation may become an important symptom of local change of structure. Independently of this, however, disordered menstruation may depend entirely upon a constitutional disease, the generative organs being healthy; while, again, other cases are met with where the uterine organs appear healthy and the general health good, and yet there is some imperfection in the manner in which the menstrual functions are performed.

As just mentioned, the period of sexual vigour (that in which women may be said to be in a fit condition for child-bearing) lasts for a little over thirty years. During this term the female system, both in health and disease, becomes considerably modified by the performance of the function of menstruation; and therefore in treating either the general or the peculiar disorders of women this circumstance should be borne in mind. And it can easily be understood, that if this is the case when the catamenia appear naturally and regularly, how likely it is that any disturbance of this process will give rise to a troublesome complication. The effect of the menstrual molimen is felt by the whole system; but especially does it influence the uterine and ovarian organs when diseased, often proving a source of anxiety while the attempt is being made to cure such affections. Moreover, this menstrual influence renders many of the disorders of the sexual system very tedious; the congestion which precedes and accompanies the flow always aggravating structural mischief for the time.

1. AMENORRHŒA.

Three distinct classes of amenorrhœa [from 'A = priv. + *μὴν* = a month + *ῥέω* = to flow] have to be described:—(1) The cases where no menstrual fluid has ever been secreted. (2) Those where there has been a secretion of the menses, without any evacuation of them. And (3) the menses having appeared naturally, their return has become interrupted; or they have been prematurely suppressed, perhaps never to return.

The *first* form of amenorrhœa is not very often met with. In some cases there has been no menstrual secretion because the patient has not reached the age at which the discharge will appear with her. For although the age of puberty mostly occurs between the 14th and 16th year, yet in many instances this does not happen until three, four, or even five years later. Of course such cases of retarded menstruation are no more to be considered as examples of permanent amenorrhœa, than is the occurrence of late dentition in infants to be regarded as a perpetual absence of teeth.

But when a female has reached adult life, when her frame has assumed the character of womanhood, when she is not chlorotic, and when all her organs (save the sexual) perform their functions naturally, then a cause for the absence of the flux should be looked for. Most frequently there will be found some congenital malformation. The ovaries are perhaps absent; or, as more frequently happens, they retain their rudimentary condition—that is to say, they would be found, if they could be seen, to present scarcely a trace of Graafian vesicles. Or these glands can exist and the uterus be absent, or so imperfectly developed as to be useless. Or again, the external parts of generation (the labia, nymphæ, and clitoris) may be natural, and yet there can be found neither a trace of a vagina, nor of uterus nor of ovaries.

Occasionally the most complete examination will fail to detect anything wrong with the uterus or ovaries. This is the case in a patient who has been under my care since February, 1855. At the present time (February, 1869), she is forty years of age, robust and apparently healthy, and has been married seventeen years. The catamenia have never appeared; there is no sexual appetite; and there has never been any pregnancy. Yet the external organs of generation are fully developed, the vaginal canal is healthy, while the uterus is of normal size and moveable and naturally placed. The uterine sound passes readily for 2½ inches; and I have attended her for attacks of ovaritis, in which the enlarged glands could be distinctly felt through the vagina. About every eight or twelve weeks—much less frequently now than formerly—there is a menstrual effort; severe pelvic and abdominal pains setting in, with considerable gastric irritability. The pain is at times agonizing, being only comparable to that set up by the passage of a renal or hepatic calculus; while it lasts, in spite of narcotics, for three or four days. Sometimes, but not always, these attacks are followed by a leucorrhœal discharge;—a discharge which many might term a vicarious menstruation. There has never been any symptom of hæmorrhage into the peritoneum (pelvic hæmatocele): though the probability of such an accident happening during these menstrual molimina has not been overlooked.

Although it is most important for the well-being of women that menstruation should take place naturally, yet it must not be forgotten that the sanguineous discharge constitutes only a part of the process. It cannot be doubted that the uterus and ovaries may be healthy, that a mature ovule may be discharged monthly from a Graafian vesicle, and that the ovule may enter the uterus, while yet there may be no flow of blood from the uterine mucous membrane. The fact of pregnancy occurring in cases where there has never been any sanguineous loss, must be regarded as a proof that this latter part of the menstrual phenomena is not indispensable to the regular accomplishment of the generative functions. Equally true is it, that an excessive flow of blood towards the sexual organs can produce hæmorrhage, without the occurrence of ovulation. I believe that not a few of the examples of very early menstruation which have been recorded, have been nothing more than cases of uterine hæmorrhage; the discharge having had no more connexion with menstruation, properly so called, than if the bleeding had taken place from the nose.

In the *second* variety of amenorrhœa there has been a secretion of the menses but no evacuation of them. Cases of this kind have already been spoken of in the section on occlusion of the vagina. But this canal may be healthy, while the os uteri is imperforate; owing to which condition the menses will accumulate in the uterine cavity, the latter gradually enlarging as in pregnancy. Now in examining these cases, care must first be taken to ascertain that the patient is not really pregnant; for the uterine orifice may have become closed from the occurrence of inflammation and ulceration after fecundation has occurred. Several examples of complete occlusion from this cause have been recorded; the inflammation having been sometimes excited by attempts on the part of ignorant persons to produce abortion, or by the use of caustics to heal ulcerations upon the labia. Moreover, disease may be set up in the cervix by a difficult labour; and then intercourse taking place before cohesion between the sides of the os uteri has happened, pregnancy has followed while the disease has also progressed.

Supposing, however, that the diagnosis is clear, and that there is a menstrual accumulation, an outlet for the latter must be made. When the os is merely closed by a membrane, this structure may be incised with the bistoury, or it can perhaps be ruptured by the uterine sound. Generally, the occlusion is more perfect; and then, if it be possible to detect any spot or dimple, where the orifice should naturally exist, it will be advisable to carefully perforate this part with a proper trocar and cannula. As the menses drain away, and for some time subsequently, care must be taken to prevent the opening thus made from closing; and this is to be done by daily using a bougie, or by occasionally introducing a small sponge or sea tangle tent (F. 426). Moreover, if the uterus be large, a compress and binder had better be applied to the abdomen directly after the operation. On the other hand, an incision or puncture will be properly made, and yet the fluid cannot be reached; either because the enlarged uterus is too far from the vulva, or because there is no proper connexion between the womb and the vagina. Then again, there are cases where the vagina is not only wanting, but it does not seem feasible to attempt the formation of such a canal. Under any of these circumstances, in order to prevent rupture of the uterus, this organ will have to be opened through the rectum; this unsatisfactory procedure being adopted with the precautions already noticed.

There remains to be considered the *third* and by far the most common form of amenorrhœa; viz. that in which the flux having been properly established, and having appeared regularly for a longer or shorter time, becomes prematurely arrested.

This form of suppression may occur suddenly, while the discharge is on, owing to some mental shock, or to the setting in of a severe fever or other acute disease, or in consequence of exposure to damp or cold. On the other hand, the amenorrhœa may take place gradually,—that is to say, without any apparent cause, the menses will not come on at the expected time, though they were natural at the previous period; or the flow may become less and less for several periods, and then entirely stop. There is usually more constitutional disturbance in cases of abrupt or acute, than of chronic suppression; but the latter is most to be feared as it is generally indicative of a more serious cause. With this form of amenorrhœa we sometimes have a variety of sympathetic ophthalmia set up. The conjunctiva gets congested, &c. at the time of the menstrual flow being due. Supposing the latter comes on, relief is experienced; but otherwise, the conjunctivitis continues and does not complete its course for some six or seven days. In almost all cases of phthisis, occurring in women during the period of sexual vigour, there is disturbed menstruation. Sometimes, as the disease is setting in, I have had to use astringents to check an excessive flow; but as a rule, the history is that of a gradual lessening of the secretion, until by the time that the tubercular deposit has begun to soften, there is complete amenorrhœa. The same course of events can be noticed, though less constantly, in affections of the kidney producing albuminuria; as well as in many other diseases which tend to induce anæmia. Moreover, inflammation of the ovaries or uterus may inflict so much structural mischief as to stop menstruation. And lastly, the occurrence of suppression in consequence of pregnancy must not be forgotten; nor should we overlook that temporary cessation which sometimes occurs for the two or three periods following upon marriage, and which leads the woman to suppose herself pregnant when the amenorrhœa is only due to excessive excitement.

With regard to the treatment of suppressed menstruation, the mitigation or removal of the cause should be the practitioner's first aim. Then, if there be any menstrual effort, this should be encouraged, and if not, attempts ought usually to be made to induce it. Where the prominent symptoms are those of general plethora, much good may be done by administering purgatives, selecting such as will unload the congested liver while they excite the uterine organs. A mixture of nitric acid and taraxacum and senna (F. 147), or of aloes and senna and sulphate of magnesia (F. 150), or of gamboge and aloes and blue pill (F. 174), or of podophyllin and aloes (F. 422) will often serve this double purpose. When the bowels have been acted upon, iodide of potassium in small doses, with five or ten drops of tincture of iodine will sometimes bring on the flow. These medicines should be particularly given as the time for the period approaches; and then if there be no flow, from three to six leeches may be applied to the lips of the uterus by means of the speculum. Enemata of hot salt water often do good. Sea bathing, or cold hip baths, or mustard pediluvia will also deserve trial. Plenty of exercise should be taken on foot or even on horseback. A light and unstimulating diet had better be ordered.

Instead of the system appearing plethoric, however, the indications are much more frequently those of anæmia. Under these circumstances, the general health is to be improved; and no drugs are generally more useful than those which contain some preparation of steel. The patient is on no account to be purged; but if there be constipation a daily evacuation may be procured by giving steel in combination with aloes (F. 154, 393, 404). Stimulating diuretics sometimes prove serviceable—particularly the spirit of nitrous ether, and the spirit of juniper or common gin. The other remedies deserving of recollection are the iodide of iron (F. 32), strychnia and steel (F. 408), savin and steel (F. 421), oil of rue and ergot (F. 422), stimulating foot baths, hot hip baths, vaginal injections of warm water, galvanism, &c. I have no faith in galvanic pessaries (intra-uterine stems formed of parallel bars of zinc and copper) for any form of amenorrhœa, but on the contrary believe they may produce much more mischief than can arise from the condition they are meant to relieve. The continuous galvanic current passed through the pelvic viscera may however be useful. The use of the waters at Spa (F. 467), Ems (F. 486), Schwalbach (F. 488), Eger (F. 498), &c., may be recommended under certain circumstances. The diet ought to be nourishing, care is to be taken that the food is properly assimilated, and some light wine or beer must often be allowed. Exposure to damp and cold is to be carefully guarded against; while the body should be warmly clothed, having flannel next the skin.

With regard to those cases where the suppression is a part only of some severe disease—*e.g.* phthisis, Bright's disease, &c. attempts to bring back the discharge will only prove injurious. It has always seemed to me, that the cessation of the flow in such cases is really conservative; while its spontaneous return may be taken as evidence of a general tendency towards improvement.

2. DYSMENORRHŒA.

The woman who enjoys perfect health not only menstruates regularly, but she does so free from any suffering. There are very few, however, who pass through the whole period of sexual vigour without more or less frequently having to endure an attack of dysmenorrhœa [from Δυς = difficulty + μὴν = a month + ῥέω = to flow]. Some few females experience great pain with each flow, from the commencement of puberty until the change of life; while in others, pain is only an exceptional accompaniment. With some women marriage effects a cure; while in others (especially where there is sterility) it either aggravates or originates dysmenorrhœa. Whether this pain have its seat in the uterus, or ovaries, or pelvic peritoneum, or in the pelvic connective tissue is often difficult to determine. Three distinct varieties of dysmenorrhœa have to be considered—viz. the neuralgic, the congestive, and the mechanical.

1. *Neuralgic dysmenorrhœa* seems most frequently to afflict young nervous women, in delicate health at the time of puberty; or it comes on after some ten or twelve years of painless menstruation, especially in those who have never been pregnant.

The suffering usually commences a day or two before the period, with a feeling of malaise, headache, and pain about the sacrum and lower region of the abdomen. The upper and inner parts of the thighs become tender, the surface of the abdomen feels sore, and a sense of weight or bearing down about the pelvis is complained of. Suppose the discharge then comes on at all freely, relief is generally experienced; but more commonly there are only slight gushes, or the flow is scanty, and the suffering becomes so severe that the patient is obliged to keep in the recumbent posture. If she obtain a few hours' ease, she is in fear of the pain returning; experience having taught her that a short respite may be followed by a violent paroxysm. It is probable that the ovaries are more the seat of this neuralgic pain than the uterus; though the bearing down may be due to the irritability of the os and cervix uteri, being analogous to that troublesome straining and frequent desire to go to stool which is so constantly present in diseases of the rectum. On making a vaginal examination, during the intervals, only negative information will be obtained. The parts are neither swollen nor hot, and even on pressing about the ovarian regions little or no tenderness may then be complained of. The effects upon the system are seldom well marked. Yet the patient without being ill can scarcely be said to be well. She is sometimes hysterical, is apt to suffer from flatulence and nausea and constipation, has frequent attacks of headache, is chilly, and often labours under fits of mental depression.

The cure of neuralgic dysmenorrhœa is almost always tedious. To relieve the pain just before the flow comes on, the hot hip bath should be employed; the patient remaining in it for from thirty to forty-five minutes. The addition of an ounce of carbonate of soda with the same quantity of extract of poppies to the water, renders it more soothing; while this good effect can be best kept up by the use, immediately afterwards, of a pessary of oxide of zinc and belladonna (F. 423). Where the pain continues severe, some other narcotic will also be needed; and recourse may be had to a mixture of Indian hemp and ether, &c. (F. 342), or to one or two grains of the extract of opium with a glass of hot gin and water, or to the hypodermic injection of morphia (F. 314).

During the intervals between the periods the general health must be improved, and the nervous system strengthened. Such tonics as bark and phosphoric acid and aconite (F. 376), quinine and one of the mineral acids (F. 379), salicin with some bitter infusion (F. 388), or the hypophosphite of soda and sumbul (F. 419), often prove very serviceable. Cod liver oil (F. 389) is frequently useful. Supposing there to be any evidence of gout or rheumatism being connected with the pain, the remedies for these diseases will have to be recommended. So if the patient has been exposed to the influence of malaria, large doses of quinine or of arsenic will be called for. If there be constipation, mild laxatives may be prescribed,—compound rhubarb pill, the effervescing citrate of magnesia, a teaspoonful of taraxacum juice in a tumblerful of cold water, or simple enemata. A cupful of chamomile tea, taken early every morning, not only acts as a tonic and stomachic, but will probably also serve to keep the bowels regular. The diet is to be nourishing, milk or cocoa being substituted for tea and coffee: a regulated quantity of wine, or of weak brandy and water, or of bitter ale, may usually be allowed. Country air and out-door exercise, early hours, interesting pursuits, and warm clothing are all important aids in forwarding recovery. With married women, it is better to forbid sexual intercourse for a few weeks—possibly ten or twelve; and then should pregnancy happen, the cure may be regarded as accomplished. During the period of rest, if there be persistent tenderness about the ovaries the belladonna pessaries already recommended should be used every night, or every other night. Under these circumstances also, chlorate of potash and bark will often agree remarkably well.

2. *Congestive dysmenorrhœa,* sometimes described as inflammatory dysmenorrhœa, generally occurs at a later time of life than the neuralgic form. The cause of this variety may be simple congestion with irritability of the uterine lining membrane; or the symptoms will be found connected with endometritis, or ovaritis, or pelvic cellulitis, &c.

The suffering commences, or is greatly aggravated, four or five days before each period; while it may continue, with more or less interruption, for a week. Complaint is especially made of nausea, backache, weariness and restlessness, and a sensation of weight about the pelvis. Frequently the patient also suffers from hæmorrhoids, with now and then more or less prolapsus of the rectum; while she is annoyed with repeated flushings, and there is often severe throbbing pain about the uterus. The discharge comes on very gradually; and as for the first day or two it is usually scanty, so it fails to relieve the suffering. But when the flow becomes more abundant, the distress gets mitigated; though there are often paroxysms of pain, as small clots and shreds of membrane get expelled from the uterine cavity. These shreds of membrane are of variable size; occasionally consisting of large flakes, and at other times of small pear-shaped sacs which constitute complete casts of the cavity of the uterus. Such casts are smooth and polished on their internal, and rough and villous on their external surfaces; their continuity being broken at certain parts, showing where the orifices of the os uteri and Fallopian tubes have existed. They consist of the epithelial lining of the uterus, being analogous to the decidua. The epithelial coat of the vagina is sometimes thrown off under the influence of inflammation, as has been previously mentioned.

If a vaginal examination be made in the interim between the periods, the cervix uteri will generally be detected congested and tender, the lips will be often seen excoriated, and there will be found pain on pressing the ovaries. There is usually an abundant and tenacious leucorrhœal discharge. Sometimes also there is uterine displacement; the bladder or the rectum being irritable according as the womb is anteflexed or retroflexed. In other instances the uterus is merely found lower in the pelvic cavity than it should be, owing to its being heavier than natural.—Frequently the breasts swell and become very tender; the tumefaction and pain increasing as each period approaches, but never entirely subsiding during the interval.

The remedies recommended for the relief of the pain in neuralgic dysmenorrhœa seldom fail to afford considerable alleviation in the form under consideration; but where they seem inefficient, and where the discharge does not come on at the proper time, the application of three or four leeches to the lips of the uterus will be serviceable. Not unfrequently I have been able greatly to mitigate the suffering by scarifying the œdematous uterine lips directly the increased uneasiness and pain have indicated that the period is approaching.

Throughout the interval attempts must be perseveringly made to effect a cure. The patient should live plainly, avoiding stimulants. She should take out of door exercise without inducing fatigue: but long country walks, dancing, and riding on horseback are to be forbidden. So long as dysmenorrhœal membranes come away, pregnancy is scarcely possible; and in such cases it is always better that sexual intercourse be avoided. As helping to produce a more healthy condition of the uterus and ovaries, while relieving the backache and bearing-down and the vesical or rectal irritability, I would recommend the steady employment of the iodide of lead and belladonna pessaries (F. 423). And then, if the disease be associated with the gouty or rheumatic diathesis, or if it have its origin in a syphilitic taint, as I am sure it sometimes has, the proper remedies for these affections must be resorted to. It is in such cases especially that warm sea water baths, colchicum, iodide of potassium, cod liver oil, and mercurial vapour baths succeed in restoring health, when other remedies have failed, and the patient has almost become disheartened.

3. *Mechanical dysmenorrhœa* is that form in which there is some obstruction to the free escape of the menstrual discharge. Hence, there are more or less violent expulsive pains, coming on in paroxysms—uterine tenesmus. The causes of the obstruction are various. There is either a stricture of the internal orifice of the uterus, or a narrowing of the whole canal of the cervix; or the external os uteri is abnormally small and contracted; or there is some uterine tumour, interfering with the patency of the cervical canal; or there is a malposition of the uterus, such as retroflexion or anteflexion, bending the uterus and giving to it the form of a common retort.

On the present occasion, I shall only treat of those cases where the dysmenorrhœa is due to stricture of the internal or external os, or to narrowing of the entire cervical canal. And believing as I do that this variety of painful menstruation is far from uncommon, that it gives rise to very considerable suffering at the periods, that it is one of the most frequent causes of sterility, while at the same time it is very amenable to proper treatment,—believing all this, I shall not distract my readers with the different opinions which gentlemen entertain on these several points. For here, as in other departments of uterine pathology, there is much disagreement; the views of obstetric physicians as to the proper management of many of the cases which fall under their observation varying as widely, as we find those of other practitioners to do when they speak of the treatment of acute inflammation, of the use of stimulants, of glaucoma and iridectomy, of stricture of the male urethra, of the resection of joints, or even of the comparative value of lithotomy and lithotrity.

The symptoms produced by contraction of the cervical canal are such as indicate an obstruction to the escape of the menstrual fluid. There is usually a scanty flow. Often the discharge escapes in gushes instead of oozing drop by drop through the os uteri, each gush being preceded by a bearing-down effort and accompanied by an expulsive pain. The stomach is irritable, so that there are attacks of nausea and retching, with flatulence and perhaps constipation; while there is always severe backache, often irritability of the bladder, and frequently congestion with tenderness of the ovaries. The narrowing will either be congenital, or it may be the result of an attack of endometritis. On making an examination, the os uteri will be seen very small, perhaps not larger than a common pin's head; or it may be of the natural size, the stricture only existing at the internal os, through which the uterine sound cannot be introduced without considerable difficulty. Sometimes the contraction is so great that we are unable to pass the sound at all, or it can only be made to enter for about an inch or less. In such cases we must either wait for the end of a menstrual period, or relax the tissues by the application to the uterine labia of three or four leeches before again using this instrument.

The treatment required in these cases consists in so permanently widening the cervical canal that the menses may pass away without difficulty. The question is, how to do this efficiently and with the least risk? Many physicians recommend gradual dilatation; and they effect this either by bougies, sea tangle or sponge tents, or by the introduction of instruments with expanding blades which are specially made for the purpose. Now there is one great objection to this practice—not that it is painful, for all local interference causes more or less suffering; not that it is apt to be followed by pelvic cellulitis, for there is a liability to this in whatever way the uterus may be handled,—but that it does not effect a permanent cure. For to whatever justifiable extent the stretching may be carried, the contraction will certainly return; unless, indeed, pregnancy should fortunately occur directly the course of treatment is over. If we take a piece of india-rubber, shaped and perforated down its centre so as to resemble the uterus, and then daily introduce a larger and larger bougie along the roughly-made passage, leaving the instrument in for ten or fifteen minutes on each occasion,—we shall succeed in forming, by the end of a month, just as great a canal as we can do in the case of the cervix uteri by the same means. A piece of caoutchouc does not more certainly contract after extension, than does the fibro-muscular structure of the nulliparous uterus. It has happened to me to have to dilate, with sponge tents, a virgin cervix for the removal of an intra-uterine polypus. Six weeks after the extraction of this growth, which was the size of a small orange, the contraction of the cervix had become so great that the sound could only be introduced by employing a little force; although there had been no inflammatory action, and the cure had been effected without an untoward symptom. But I might speak nearer the mark, and adduce instances where I have perseveringly tried dilatation in these cases of contraction, and where the result has been most disappointing to the patient and myself. Suffice it, however, to say, that nothing which I have read, and nothing which I have done, can lead me to advocate this practice.

Some years since (about 1847) Sir James Y. Simpson recommended the incision of the narrowed uterine canal by means of the hysterotome. Of course, this operation has been deemed perfectly unjustifiable; while sad pictures have been drawn of the results which have followed its employment. Nevertheless, among the many improvements in practice which we own to Professor Simpson's great skill, I believe there are few for which we ought to be more grateful than for this. The hysterotome invented by this gentleman is well known. It is indeed only a concealed knife, the sharp edge of which can be made to protrude to a regulated extent by pressure upon a spring; but as there is only one blade, it has to be applied first to one side of the cervical canal and then to the other. In using it there is a fear also that the incisions may be made too deeply, and hence that severe hæmorrhage will arise from wounding the circular arteries which are found in the neighbourhood of the internal os. To obviate these inconveniences, a very ingenious curved double-action hysterotome has been constructed by Mr. Coxeter, under the direction of Dr. Routh; and I have pleasure in saying that this instrument answers its purpose admirably. The blades are protected, so that the instrument is introduced like the uterine sound, passing it upwards until the lips of the os rest upon the broad shoulder; and then by pulling down the handle from the sheath, the blades are made to open and expand, producing a limited and uniform cut surface as they descend.

The way in which, then, I now treat these cases of contraction is as follows:—The patient is placed upon her left side, in the ordinary position for labour, with her legs drawn up and the body curved. The bowels have been previously well acted on. Chloroform is seldom needed. The sound is passed to render the canal more patent, as well as to make sure that there is no abnormality except the stricture; and then the hysterotome is introduced, without using the speculum, and the incisions being rapidly made, the instrument is withdrawn. Having been taught by experience that severe bleeding is apt to follow this operation, I always take steps to prevent it; either by employing one of Dr. Greenhalgh's spring stem pessaries which compresses the cut surfaces, or by plugging. To do the latter properly, it is necessary to introduce the speculum; through which I first pass a long strip of oiled lint completely up the whole length of the cervix, and then push up pellets of cotton wool into the vagina so as firmly to plug this canal. The only inconvenience which results from the employment of the plug is, that micturition is most times impeded, so that the catheter has to be employed ; but to counterbalance this, the patient can be left with the conviction that she is safe from bleeding. The plug, thus introduced, is usually left undisturbed for forty-eight hours ; and then, after its removal, I insist upon the strictest quiet being maintained, not even allowing the patient to sit up in bed, lest hæmorrhage should come on. The following day I introduce the uterine sound, well covered with lard ; for it must be remembered that no operation will answer in these cases unless we adopt measures to keep the incisions open. After thus using the sound on two or three days I introduce a slight and curved uterine stem which has been made for me by Mr. Coxeter ; and this the patient is allowed to wear, unless it be badly borne, for several weeks. She leaves her bed and walks about while the stem is in the cavity ; although of course she is watched at intervals, so as to guard against any attack of inflammation. Very rarely (much more seldom indeed than after the employment of sponge tents) symptoms of pelvic cellulitis have set in ; but the prompt use of hot hip baths, medicated pessaries, and opiates has always checked the mischief. I do not remember having met with any case where the inflammation has gone on to suppuration under these circumstances. Moreover, the operation has never proved directly or indirectly fatal in my hands.—I have been thus minute in describing this proceeding partly on account of its importance in regard to the cases under consideration, and partly also because, as will appear further on, it is a valuable operation in some of the other diseases to which the uterus is liable.

3. MENORRHAGIA AND METRORRHAGIA.

Two forms of uterine hæmorrhage have to be distinguished, viz., menorrhagia and metrorrhagia. The term *menorrhagia* [Μῆνες = the menses + *ῥήγνυμι* = to burst out] should only be applied to cases of increased menstrual flow ; although it is very often employed to signify any sanguineous discharge from the uterus other than the normal monthly escape. *Metrorrhagia* [Μήτρα = the womb + *ῥήγνυμι*] is the technical expression for hæmorrhage occurring from the uterus, independently of menstruation.

By excessive menstruation is frequently meant either a more abundant escape than is natural to the subject of it, or a prolonged flow, or a recurrence of the sanguineous discharge at short intervals —sometimes so short that the patient says she is constantly unwell. As a rule to which there are many exceptions, the first variety depends upon undue uterine and ovarian congestion, set up by constitutional causes; the second is also caused by some general influence, or it is induced by slight disease of the uterus or ovaries; while the third (more correctly spoken of as metrorrhagia or uterine hæmorrhage) is generally significant of the presence of some organic disease.

The *catamenia may be abnormally increased* from conditions which produce attenuated blood; as tuberculosis, granular degeneration of the kidneys, affections of the spleen, anæmia from whatever cause but especially from prolonged lactation. Another common cause is excessive congestion of the ovary and uterus during the maturation and escape of the ovule. The same result also ensues from any great excitement at the monthly period, or excessive sexual indulgence at other times; from metritis and ovaritis; from the approach of "the change of life;" from such relaxation of the uterine tissue as is often associated with abrasion of the lips of the cervix, as well as from the hæmorrhagic diathesis, or from purpura hæmorrhagica. Moreover, where there is structural disease of the uterus—*e.g.* fibroid tumour, polypus, or cancer—the menstrual flow frequently merges into uterine hæmorrhage, and thus proves most troublesome. It is frequently very disheartening in the treatment of fibroid tumour to find, that just as the strength is being regained the monthly period comes round; the flow, by its excess, prostrating the patient, and undoing all that has been accomplished in the preceding two or three weeks.

The diseases which give rise to *uterine hæmorrhage*, properly so-called, are principally cancer; polypi, whether cellular or glandular or fibrous; as well as fibroid tumours, especially such as produce enlargement of the uterine cavity, or which impede contraction of the muscular fibre-cells and other structures composing the wall of the uterus. Then this condition may be occasioned by congestion of the uterus or ovaries; by inflammatory engorgement or hypertrophy of the whole uterus, or of the cervix and labia only; and by fungoid degeneration of the mucous membrane lining the uterine cavity. Among the more exceptional causes of hæmorrhage we must not omit to mention pelvic hæmatocele; subinvolution, as well as chronic inversion of the uterus; and the retention in the womb of any portion of a product of conception,—such as a vesicular mole, &c. Any of the foregoing affections may produce frequent attacks of bleeding, or a constant loss. The blood comes away steadily, drop by drop, with occasional small coagula, so as to saturate three or four napkins in the twenty-four hours; or there are gushes at intervals, with large clots; or the loss at times becomes so severe as to amount to flooding. The practitioner must also remember the frequency with which copious hæmorrhage proves to be the precursor of abortion; no less than the constancy with which it indicates more or less separation of the placenta—perhaps owing to placenta prævia—in the latter months of pregnancy.

Now with regard to uterine hæmorrhage it is scarcely necessary to say, that the effects upon the system will vary with the extent of the loss. In most of the instances which have come under my notice these effects have been but too well-marked. Thus, the patients have been pallid and feeble, unable to go through any exertion, low-spirited, and restless at night; they have suffered from loss of appetite and constipation; there has been more or less irritability of the stomach, as indicated by frequent attacks of nausea and sickness; and occasionally I have found considerable œdema of the lower extremities. In severe cases the bloodless aspect of the patient, and the attacks of syncope which have followed on any attempt to assume the upright posture, have sufficed to show the alarming condition to which the sufferers have become reduced.

Such being the troublesome and dangerous symptoms which may arise from protracted or frequent attacks of flooding, it appears very important that we should have some rule to guide us in their *treatment*. And it seems to me, from a careful observation of many cases, that some such law as the following may be laid down:—That when a woman suffers from repeated attacks of uterine hæmorrhage, which can only be partially or temporarily relieved by the use of rest, nourishing food, and proper astringents, we may be sure that there is some organic disease of the ovaries or of the uterus. If of the former, one or both of the glands will be found enlarged or tender, on making a vaginal examination; if of the latter, the same proceeding may at once afford either positive or only negative evidence. By positive evidence is meant that there will be discovered simple or malignant ulceration of the cervix; or a polypus or other tumour projecting at the os uteri, or lying in the vagina; or an inversion of the uterus; or a morbidly patent os uteri, the consequence of cervical endometritis. The value of negative evidence is, of course, difficult to appraise. Still, although the os uteri may only be of the normal size and free from any excoriation, and though the cervix and body may feel healthy to the touch, yet we can be certain that the bleeding is due to some actual disease—that it is not functional. I would say, under such circumstances, that it is in all probability caused by one of the following conditions:—Either by malignant disease confined to the fundus uteri, by an unhealthy pulpy condition of the mucous coat, or by the growth of fungoid vegetations on this coat; by some dead or diseased product of gestation, retained within the uterine cavity; or by the presence of a polypus, or of a fibroid tumour. The first of these causes is so rare, that it need not be allowed to enter into our calculation; inasmuch as, after some research, I am inclined to think that half a dozen specimens of cancer confined to the fundus are not to be found in the whole of the pathological collections of the London Hospitals. With regard to the remaining causes there is only one plan of treatment which can be adopted with a reasonable hope of success, and that is to dilate the os and cervix thoroughly, with sea tangle or sponge tents (F. 426), so as to permit of the removal of the source of the evil. For it matters not whether there be disease of the lining coat of the uterus, a dead ovum, or a tumour, so far as the production of hæmorrhage is concerned; while with regard to the two latter conditions, at least, nought but removal can lead to an effectual cure.

It will be necessary to confine the remarks upon the *treatment* of menorrhagia and metrorrhagia in general to the steps to be adopted for controlling the hæmorrhage; since the proceedings required for removing its cause are treated of in describing the morbid conditions which give rise to menorrhagia or metrorrhagia. At once, therefore, it may be said that astringents are the remedies chiefly to be trusted to; and the best of these are gallic acid and cinnamon, either alone or in combination, or with the aromatic sulphuric acid (F. 103, 104). Some authorities advise the acetate of lead: if used, it should be given in larger doses than are ordinarily employed (F. 117). Where any inflammatory action exists, mercury will be a good agent to employ; and, as before mentioned, I prefer the solution of corrosive sublimate (F. 27). The ergot of rye has no styptic property; though when the bleeding is due to a flabby state of the uterus, this drug does considerable good by inducing contraction. There is no objection to administering it in combination with astringents (F. 103). Supposing there is anæmia as a cause of the loss, the ammonio-sulphate of iron proves very efficacious (F. 116); more so, in my opinion, than the perchloride of iron. The latter, however, is sometimes serviceable (F. 101). Every now and then we meet with cases where the discharge of blood is excessive, though we can detect no cause for it, and where no kind of astringent or tonic has the least effect. In such I have found most benefit from corrosive sublimate, or some other preparation of mercury; the infusion of digitalis, in half-ounce or ounce doses, as strongly recommended by Drs. Dickinson and Robert Lee, having given me nought but disappointment.

The local remedies to be resorted to are of considerable importance. The principal are as follows:—A favourite remedy is the application of cold water over the pubes. To be of any service, ice in a bladder should be employed. Napkins dipped in vinegar and water, soon get converted into offensive fomentations. The frequent introduction of small lumps of ice up the vagina, or the use of enemata of very cold water, will often prove efficacious. The same remark applies to vaginal injections of tannic acid or infusion of matico; especially if the patient's hips be so raised that a portion of the fluid can be retained at the top of the vagina. I have also seen great good follow the employment of astringent vaginal pessaries (F. 423); or the use of Faradization where there is a want of muscular contraction; or the introduction of sponge tents up the canal of the cervix, and through the internal os (F. 426). These plans failing, or it seeming probable that they will fail if tried, recourse should be had to plugging the vagina firmly with some soft material like cotton wool; or with a sponge soaked in vinegar; or with an elastic air-ball enclosed in a case of spongio-piline, which is capable of exerting considerable pressure on being distended. Plugging the os uteri only, with lint or cotton wool, does not succeed as well as might be anticipated; for the foreign body seems to cause contraction, so that it is soon expelled into the vagina. In several instances where there has been troublesome hæmorrhage from the upper part of the interior of the uterus, I have succeeded in stopping it with the styptic rod of tannin and cacao butter (F. 424). The passage of this rod into the uterine cavity is easily accomplished; while in no case has its retention and dissolution in the uterus produced any unpleasant symptoms. The patient is of course to be kept quiet in bed in all cases; the diet, &c. being such as has been advised in managing the other important varieties of hæmorrhage.

4. UTERINE CATARRH.

The mucous membrane lining the uterus, like that of other cavities, will now and then become affected with catarrhal or croupy inflammation. This condition, accurately defined by the term endometritis [from Ἔνδον = within + μήτρα = the womb; terminal *-itis*], is attended with one prominent symptom—a tenacious mucous discharge; and hence the disease is commonly spoken of as *uterine catarrh*, or *uterine leucorrhœa.*

Causes.—Whatever irritates the uterine mucous membrane is apt to set up inflammation in this tissue. Hence it is never met with before puberty, though it is by no means rare afterwards. The most common cause of endometritis is the too frequent occurrence of pregnancy, especially when one gestation after another ends in abortion. Polypi within the uterus, as also intra-uterine fibroids, will set up a low form of inflammatory action. Congestion of the uterus may terminate in inflammation of the lining membrane; and in this way exposure to cold and wet, excessive sexual excitement, &c. must be mentioned as causes. Contact with an unhealthy secretion from the male urethra will often induce inflammation; or vaginitis, however originated, can give rise to it when the morbid action travels upwards. Endometritis occasionally occurs as the consequence of a morbid state of the blood. Thus, it is sometimes a manifestation of a syphilitic taint; it may happen during the course of the eruptive fevers; and it has been also observed in cases of typhus and typhoid fever, of cholera, of dysentery, &c. Just prior to the menstrual period a state exists very much resembling that of catarrhal inflammation; and unless there be sufficient vitality to produce rupture of the vessels and the consequent natural discharge, the inflammatory action will very probably persist and uterine leucorrhœa supersede or become vicarious of the catamenia. This is a condition often met with in delicate young women for two or three periods after the first menstruation, constituting the *menstruæ albæ* of old authors; while it is very common in cases of chlorosis, in the anæmic condition which is present during convalescence from severe disease, &c. About the change of life, moreover, a mucous discharge from the uterus not uncommonly takes the place of the menses for a few periods before their final cessation.

Pathology.—The inflammation may be acute or chronic; while it is either limited to the mucous membrane of the cervix, or that of the body and fundus of the uterus will likewise be involved. Not unfrequently, the morbid action is confined to the lining membrane of the body of the womb.

Where the affection is acute (acute catarrhal endometritis) the whole structure of the uterus seems to be more or less spongy and congested. The lining membrane is rendered intensely red, œdematous, and softened; while occasionally there are small and scattered patches of extravasated blood. The tubular follicles become somewhat turgid and prominent. The mucous membrane is also easily scraped or separated in shreds or laminæ from the subjacent tissues; while now and then it comes away as a complete cast of the uterus. Although at first this membrane is unnaturally dry, it soon pours out a thick tenacious discharge; which subsequently becomes muco-purulent, and often more or less tinged with blood. The more the cervical portion of the mucous membrane is involved, the more tenacious and gummy will be this discharge; which then imparts a starched greenish-yellow or a yellowish-red stain to the patient's linen. The lips of the cervix are often swollen, while they exhibit patches of excoriation or one large abrasion.

Chronic catarrhal inflammation presents a condition analogous to that which is seen in chronic nasal catarrh; that is to say, we have an irritable membrane, œdematous in some parts and excoriated in others, secreting an abundant glairy mucus resembling the white of egg. There is no active congestion; but the membrane is spongy, and is often thrown off in small flakes. The discharge is seldom tinged with blood. Acute endometritis sometimes runs its course in ten or fifteen days, and the morbid action entirely ceases; but much more commonly it insensibly passes into the chronic form, when a most troublesome and obstinate disorder gets set up. In consequence of it there may occur a kind of fungous degeneration of the uterine mucous membrane; in which we find this structure more or less studded with little sessile growths, or with minute vegetations like follicular polypi. Such a degeneration keeps up the catarrhal secretion, while it is also a frequent cause of metrorrhagia. According to some authorities, endometritis may cause glandular and cystic growths; while even fibrous polypi or tumours will result, if the proliferations of the mucous membrane go on to a sufficient extent.

Symptoms.—In the *acute* variety there are certain general symptoms always present. Thus, we find more or less feverishness, general irritability, a sallow complexion, and loss of appetite; pain about the lower part of the abdomen, the sacrum, groins, and upper part of the thighs; a feeling of heat and fulness in the pelvis; a sense of bearing-down, which is relieved by the recumbent posture; and a frequent desire to pass urine, this secretion being loaded either with urates or uric acid. At first, also, there is often diarrhœa and tenesmus; but in a few days the bowels may become just as much confined as they were previously relaxed. Hæmorrhoids are not uncommonly present: at times there is prolapsus of the bowel. The ovaries and uterus are always very tender on pressure, while an internal examination shows that the latter organ is congested and augmented in volume; but when, about the third day, a secretion takes place from the mucous membrane, this tenderness and congestion begin to diminish, while we find the os uteri patulous and the cervical canal dilated.

The chief symptoms of the *chronic* form are the abundant catarrhal discharges, and the painful derangement of the menstrual functions; while there are also obstinate disturbances of the digestive functions, backache, headache, lassitude, and a slow loss of strength. For a long time the patient is neither ill nor well; and though she gets low-spirited, yet she oft-times tries to persuade herself that there is nothing wrong. After the discharge has continued for some weeks, it begins to tell upon her health; while her sallow appearance, loss of appetite, and incapacity for any mental or bodily exertion begin to alarm her friends.

Now although there is much difficulty in saying where the acute process terminates and the chronic commences, yet it is much easier to ascertain from the symptoms whether the morbid action be confined to the mucous membrane of the cervix, or whether that of the body and fundus be also involved. For in the latter case, the disease not only appears to be more generally severe, but it has a peculiar tendency to set up hysterical or convulsive affections, to induce frequent attacks of nausea and tympanites, to make the breasts tender and swollen, and to cause menorrhagia. Moreover, in endometritis of the fundus a digital examination provokes much more abdominal and pelvic pain than is complained of when the inflammation is limited to the cervix; while in the former the introduction of the uterine sound causes much local suffering, and often brings on an attack of hysteria or even an epileptiform seizure. In both, the withdrawal of the sound is followed by a glutinous and often sanguineous discharge, the latter perhaps persisting for two or three days; while also in both forms, ulceration, or at all events, excoriation, is set up about the lips of the womb, probably through the irritation caused by the acrid discharge. When the disease is limited to the cervix, the uterine cavity generally remains of its natural size.

Chronic endometritis is an occasional cause of vaginitis, of vulval pruritus, of ovarian irritation, of menorrhagia, of abrasion of the labia uteri, of stricture of the canal of the cervix, of contraction of the os uteri, and of sterility. The persistence of an abundant purulent discharge for many months must greatly injure the general health; and consequently it now and then happens that these cases lead to tubercular disease of the lungs, or to amyloid degeneration of the liver or kidneys or other important structures.

Diagnosis.—The symptoms of acute endometritis are so characteristic that this disease can scarcely be mistaken for any other. After the disorder has been present for some time in a chronic form, there may be some little difficulty in distinguishing between it and chronic vaginitis. The discharge in uterine catarrh consists of an alkaline plastic fluid, containing mucous and pus corpuscles, fatty matter, casts of the tubular follicles, and perfect with disintegrated cylindrical epithelium. In vaginal catarrh the white or creamy-looking secretion is made up of an acid plasma, with fatty particles, mucous and pus cells, and tesselated or pavement epithelium. On other points, attention to the remarks made at p. 333 will help to prevent the practitioner from committing any error.

Treatment.—The management of the *acute* form is chiefly resolved into ordering complete rest in bed, a diet of fish and milk and mucilaginous drinks, remedies to alleviate uterine congestion and pain, as well as in regulating the bowels. At the commencement, a dose of calomel and compound jalap powder (F. 159) often acts very beneficially. A warm hip bath night and morning, where there is no hæmorrhage, should be prescribed; while the injection of hot water with a syphon syringe, as the patient sits in the bath, gives considerable relief. At night, a pessary of mercury and belladonna (F. 423) may be introduced into the vagina; and if there be much tenderness at the lower part of the abdomen hot linseed poultices ought also to be applied. If the symptoms do not appear to yield, and if there be no menorrhagia, the application of from four to six leeches to the lips of the uterus can be recommended. It would seem unnecessary where there is so much pain and tenderness to forbid sexual intercourse; but remembering that women with even uterine cancer will sometimes submit to connexion, it is better to be explicit on this head. I have seen patients nearly well from an attack of endometritis have all their sufferings reproduced by sleeping with their husbands. Moreover, the uterine discharges in these cases are very likely to excite severe inflammation of the male urethra.

The *chronic* variety runs a tedious course, which it often seems impossible to influence. Frequently, advice is not sought until the disease has existed some time; or perhaps inefficient treatment is adopted, the case being regarded as one of hysteria. Speaking generally, the two remedies from the simultaneous employment of which I have found the most benefit are mercury and cod liver oil. With regard to the first, we have several preparations to choose from. In very obstinate cases, the green iodide of mercury (F. 53), or the red iodide (F. 54), or even Donovan's triple solution (F. 51), will prove useful; but a prolonged course of the corrosive sublimate with sarsaparilla (F. 27) often suffices, and is usually better borne than the other kinds. Sometimes it has seemed more efficacious to employ iodide of potassium (F. 31), while the mercurial and belladonna pessaries have been introduced into the vagina. It is difficult to explain the action of the cod liver oil, but of its efficacy I have no doubt. The use of pepsine (F. 420) will often aid its digestion. Where there is evidence of much congestion about the uterus and its appendages, leeches may be applied once or twice a week to the labia; but in the absence of this symptom, local depletion is often more powerful for harm than good. Moreover, when there is anything like menorrhagia, leeches are of course unnecessary. The instances in which they prove most useful are those where, with congestion, we find considerable narrowing of the os uteri; but here it is often a better practice to divide the constricted mouth with the hysterotome (p. 369), more especially where the patient is married and is anxious to have children. For it must be remembered, that not only is endometritis a cause of sterility, but by producing constriction of the cervical canal it may render the woman barren after she has been completely cured of the inflammation.

Where the symptoms indicate that the mucous membrane of the body and fundus is involved in the inflammation, I believe that the introduction of remedies into the uterus will only aggravate the mischief. If there be any exception to this rule, it is when the disease has become very chronic and all tendency to convulsive affections has passed off. But in cervical endometritis considerable assistance may often be derived from the application of astringents to the diseased membrane. Hence the solid nitrate of silver can be passed up the canal, or the latter may be swabbed with a piece of cotton wool dipped in a concentrated solution of perchloride of iron; or a strong solution of carbolic acid made by adding 100 grains of the acid to an ounce of the glycerinum acidi carbolici may be applied on cotton wool wound round a sound of roughened soft metal as recommended by Dr. Playfair; or a stick of tannin and cocoa butter, or of sulphate of zinc and the same material, or of mercurial ointment and cocoa butter

(F. 424) may be advantageously used. The cases which have been recorded of death from the use of intra-uterine injections, have prejudiced me against the practice of throwing fluids into the uterus; and certainly such remedies ought never to be employed, unless the os uteri be rendered so patulous by the previous use of sea-tangle tents that the injection can readily flow away while the small tube of the syringe is in the orifice of the womb. Counter-irritation by means of blistering fluids, or the actual cautery, or potassa fusa applied to the lips of the cervix is productive of good in very tedious cases.

It only remains to add that the diet in chronic cases must be nourishing, animal food and milk and raw eggs being useful. Stimulants need not be forbidden, with the exception of malt liquors. Gentle exercise in the open air does good; a daily drive in an open carriage being especially serviceable. When the discharge has entirely ceased, the necessity for further treatment is generally at an end; but if the system appear deficient in tone, the cod liver oil should be continued, while one of the minerals acids with bark (F. 376) had better be administered. The officinal sulphate of beberia, in doses of five grains thrice daily, often does great good under these circumstances. I am generally averse to the employment of steel until the recovery has been complete and of some duration; but if there be depression, and other circumstances will permit of it, a visit to the baths of Spa (F. 467), Homburg (F. 491), Carlsbad (F. 496), Marienbad (F. 497), or Kissingen (F. 493), can be advantageously recommended.

5. INFLAMMATION OF THE UTERUS.

Inflammation of the substance or parenchyma of the unimpregnated uterus is undoubtedly a very rare disease. When it occurs, either the muscular tissue of the body will be alone affected; or the morbid action will be confined to the cervix; or, as more frequently happens, the whole of the parenchyma from the os to the fundus will be involved. When the inflammation ends speedily in resolution, the lining membrane generally escapes.

Causes.—Acute metritis [from Μήτρα = the womb; terminal -*itis*] may result from the sudden suppression of menstruation before that congestion of the uterus and its appendages which is present at each period has been sufficiently relieved. In this way, exposure to cold, great fatigue, excessive mental excitement, and intercourse with violence may induce it. Occasionally, the irritation set up by a fibroid tumour in the uterine walls has been the starting point. The extension of the inflammation in endometritis is also possible, as well as that in simple or gonorrhœal vaginitis. But probably the most frequent cause is mechanical injury; such as may be inflicted by the careless use of the uterine sound, by the abuse of powerful caustics, or by rude and criminal attempts to bring about abortion at an early period of pregnancy.

Puerperal metritis is not a very uncommon disease; but it has little or no resemblance—either as regards its symptoms, or grave importance, or the treatment it requires, with the non-puerperal variety now under consideration.

Symptoms.—An attack of metritis may set in suddenly with rigors followed by feverishness, though ordinarily it comes on gradually. Complaint is made of a feeling of fulness and weight, of irritation and heat throughout the pelvis. There is an unpleasant sense of throbbing, with tenderness, about the pubes and groins and perineum. The bladder is irritable, there is often nausea with vomiting, while there may be diarrhœa with tenesmus. And then, at the end of twenty-four or thirty-six hours, the uterus becomes the seat of considerable suffering: acute paroxysms of pain coming on at short intervals. With these attacks of pain there is usually a copious purulent or tenacious muco-purulent discharge, although sometimes there is a flow of blood. If a vaginal examination be made, the mouth of the uterus will be found patulous, while the lips are puffy; the body appearing heavy, hot, congested, and exceedingly sensitive. The canal of the vagina often seems to be shortened (partly because the uterus falls lower than it does in health), and its walls are œdematous. The bloodvessels also, about the cervix and upper part of the vagina, can be felt pulsating with considerable force. Moreover, great pain is experienced on making pressure downwards into the pelvis, through the lower part of the abdomen. The patient keeps in the recumbent posture and often with her knees drawn up; for sitting erect increases the pain and throbbing, as well as the irritability of the bladder and rectum.

The acute symptoms generally subside in from five to eight days. In favourable cases the inflammation gets resolved, and no ill-effects ensue. But occasionally, the disease leads to the formation of one or more abscesses in the parenchyma of the uterus; or it may give rise to hypertrophy of the uterus, with induration of the labia, abrasions, and subsequent menstrual irregularities with obstinate leucorrhœa, &c. In very exceptional instances, there is fatal gangrene; or a form of subacute inflammation is set up, which will very probably extend to the pelvic connective tissue (pelvic cellulitis), or to the peritoneal investment of the womb (pelvic peritonitis).

Diagnosis.—This disease can scarcely be mistaken for any other if all the symptoms be fairly considered, and if an internal examination be resorted to. The only fear is that the practitioner may fail to make the latter, from his attention being exclusively devoted to the gastric or intestinal irritation. The uterus is not fixed as it is in pelvic cellulitis and peritonitis; while in addition to retaining its mobility, it is more individually the seat of tenderness—there is less diffused pelvic pain, than is the case in inflammation of the uterine connective tissue or of the serous coat. The patency of the os uteri, the swelling of the body of the womb, and the abundant purulent discharge all point to inflammation of the parenchyma as the cause of suffering.

Treatment.—During the acute stage complete rest in bed, a simple diet with cooling drinks, and hot hip baths are required. After the patient has sat in hot water for half an hour, she can usually bear the introduction of the speculum without much pain; so as to allow of the application of four or five leeches to the lips of the womb. The bites should be encouraged to bleed, for a short time afterwards, by filling the speculum with warm water; and then when the redness and fulness of the cervix seem to have diminished, the instrument is to be withdrawn and a medicated pessary—especially one consisting of opium and belladonna (F. 423) introduced into the vagina. If the paroxysms of pain continue severe in spite of these remedies, the same practice should be resorted to on the following day. But usually it will suffice to continue the baths, and to have a pessary used each night for some five or six times. The gastric irritability will seldom require any special attention; though supposing it to do so, the use of a sinapism to the epigastrium, with the frequent sucking of small lumps of ice, will prove efficacious in controlling nausea or retching. Where the evacuations cease to contain fæcal matter and consist almost entirely of mucus, the irritability of the bowel should be decidedly checked by an opiate enema or suppository (F. 339 340).

In chronic cases the engorgement and induration will be best removed by the use of iodide of potassium with bark, by cod liver oil, by a nourishing diet, and by the employment of pessaries containing iodide of lead and conium. Unless the general health be maintained, the treatment will be useless.—Where the cervix remains much hypertrophied and indurated, it will often be advisable to rub down the hardened tissue with a stick of caustic potash. For this purpose, a glass speculum (and I may here mention, that in the treatment of uterine disease I very rarely employ any other instrument than the excellent one devised by Sir William Fergusson), sufficiently large to admit the cervix uteri into its extremity, is to be introduced into the vagina; the patient lying on her left side, with the knees drawn up. The mucous membrane over the labia is then to be destroyed with a hard pencil of caustic potash; taking care, by frequent mopping with cotton wool, that none of this deliquescent corrosive runs down between the labia and speculum into the vagina. Having made an eschar of sufficient size on one or both lips, the latter ought to be well-washed with equal parts of vinegar and water, then covered with oil, and the speculum withdrawn. Three or four days afterwards the parts are to be examined; when, if necessary, the operation should be repeated. In this way, two or three applications will often suffice to remove a state of induration which would be unaffected by any milder measures. The patient had better remain in bed for a day or two after each cauterization; while she is to persevere with the general remedies already mentioned. If there be any suspicion of the presence of a syphilitic taint, the solution of corrosive sublimate (F. 27) ought to be taken steadily for several weeks.

6. ULCERATION OF THE CERVIX.

As a frequent result of congestion and inflammation of the parenchyma of the vaginal portion of the cervix uteri, or of the mucous membrane covering it, we meet with various forms of ulceration. Many cases which are regarded as examples of irritable uterus, of so-called leucorrhœa, or of menorrhagia, have their symptoms produced by abrasions or ulcerations about the labia and cervix.

The most simple and most frequent condition which is met with consists of *abrasion* or *excoriation* of the uterine lips; with or without eversion and disease of the lower part of the mucous membrane of the cervical canal. In this affection, the epithelium is removed from a part of one or both lips; the exposed villi with their looped capillaries conveying a characteristic "velvety" feel to the touch. The abrasion is usually most marked at the edges of the uterine orifice, while it often extends for some little distance up the canal of the cervix. Sometimes the erosion is so superficial that it is difficult to say whether there is more than intense congestion present; but any doubt which may be entertained on this head can be readily solved—as suggested by Dr. Henry Bennet—by lightly touching the suspected surface with nitrate of silver. On doing this, the abraded surface assumes a much whiter tint and a more coarse appearance than the region which is simply congested, while the limits of the denuded portion become well-marked. These excoriations are of no little importance, inasmuch as they tend to keep up cervical and ovarian congestion, and thus to cause menstrual irregularities—often shown by attacks of menorrhagia; while the pelvic and sacral pains which the disease produces irritate the patient, and the constant leucorrhœal discharge ultimately gives rise to considerable weakness. At times this discharge is tinged with blood, especially after intercourse or any exertion. Should the general health become much affected, an abrasion may degenerate into a troublesome ulceration; such an occurrence, however, being far from common.

Now although there can be no doubt that these abrasions are frequently the result of some general derangement of the system, yet I believe that they are not to be cured by constitutional remedies alone. The treatment must be *local* and *general*. With regard to the *first*, considerable benefit will ensue from the use of two or three leeches, or from scarifications of the labia, where there is much congestion. Then, alum or zinc vaginal injections (F. 425), or astringent and sedative pessaries (F. 423) should be employed; or, if the woman be married, there can be no objection to the occasional application, through the speculum, of the solid nitrate of silver, or of what often answers better—the undiluted solution of subacetate of lead. In some obstinate cases, gently dabbing the excoriated surface with a pellet of wool moistened with the acid solution of nitrate of mercury, proves very efficacious; but this caustic must be applied most sparingly, since it exerts a powerful influence both locally and generally. I have seen it frequently produce tenderness of the gums, lasting for two or three days; while once or twice it has even caused salivation. Moreover, after the use of this escharotic, as of any other, I would advise the practitioner to thoroughly smear the cauterized tissue with oil or lard; a suggestion so simple that I should hesitate to make it, had not experience taught me how much such a practice adds to the comfort of the patient. Supposing there to be any eversion of the mucous lining of the cervical canal, the foregoing practice will greatly help to cure it. I have never yet seen a case where it has been necessary to pare the edges of the cervical fissure and bring them together with silver wire sutures, although I have heard of this practice being recommended.

The *general* treatment of these cases is by no means so simple as might be imagined. Even as regards the daily mode of life, opinions vary greatly; some practitioners confining the patient to the sofa and bed, while others insist upon her taking horse exercise and long walks. Both extremes, however, are equally injudicious. It seems to me better to allow the usual avocations to be quietly pursued, provided no injurious habits have been contracted. The diet should be nourishing, with a proper supply of animal food and milk; while if stimulants be needed, a little claret, or sherry, or champagne, or weak brandy and water will be found preferable to malt liquors. The digestive organs ought always to claim attention, though I would warn the practitioner against resorting to over-active remedies. Granting that abrasion of the uterus, as a local disease, has been the favourite hobby-horse of some physicians, still it is certain that others have found as rampant and mischievous a steed in the same affection when saddled with torpidity of the liver. Dyspepsia is common in these cases, but the stomach only requires gentle aid. Such agents as pepsine (F. 420), quinine and rhubarb (F. 178), oxide of silver and rhubarb and ipecacuanha (F. 179), or the nitro-hydrochloric acid in some bitter infusion (F. 378), are much more valuable than calomel, antibilious pills, black draughts, &c. Generally the system is depressed, and small doses of quinine (F. 379), or especially of salicin (F. 388), improve the appetite and tend to give tone. Supposing any alterative is needed, arsenic in combination with iodide of potassium or with quinine (F. 52) will deserve a fair trial. Where cod liver oil can be digested, and especially if the case be under observation during cold weather, this agent often proves very serviceable.—I have spoken somewhat at length on the subject of treatment, because the remedies here recommended are useful in all ulcerations (save those of a specific nature) which occur upon the cervix.

The term *ulceration* is applied to those cases where the uterine lips are not only more or less deprived of their dense epithelium, but where the villi with their vascular loops are also destroyed in patches. Every now and then it happens that the proper tissue of the uterus is involved; the process of molecular gangrene occasionally running on to such an extent, as ultimately to remove a considerable portion of the cervix.

A simple ulcer on the lips of the uterus is generally of an irregular shape, its edges are seldom well-defined, and it presents an uneven granular aspect. The tissue around the orifice of the womb is often involved; and the ulceration extends up the cervical canal, from which a quantity of glutinous mucus can be seen exuding. The vaginal portion of the cervix is also found much congested, and perhaps covered with a thick muco-purulent secretion. Where the ulcer is deep, it is usually coated with a greyish slough; the congestion is great, so that an examination may produce rather free bleeding; dilated varicose veins can frequently be seen ramifying about that part of the neck which is not involved; and the muco-purulent discharge is abundant. The congestion attendant upon ulcerations of the cervix not only extends to the body of the uterus, but to the Fallopian tubes and the ovaries. Hence there is much general uneasiness about the pelvis, sometimes burning pains are complained of, and attacks of menorrhagia are common; while there is a troublesome sense of bearing-down and weight, with backache. The general symptoms are those of anæmia with deficient nervous power. Headache is common, there is often neuralgia, the skin is of a dirty sallow hue, and the pulse is feeble; while the appetite is bad, the tongue is furred, and the bowels are irregular. As the patient feels weak, so she is indisposed to make any exertion; and as she finds the bearing-down and pelvic weight increased by walking or sitting up, she prefers keeping to the sofa. The breasts, bladder, and sometimes the rectum are likewise apt to suffer from reflex irritation.

The remedies required are much the same as those recommended for the cure of abrasion. Local bloodletting, however, is less frequently called for, since the ulcerated surfaces usually bleed freely. Care must also especially be taken not to allow the leucorrhœal discharge to accumulate in the vagina; cleanliness being insured by the employment, night and morning, of warm water or astringent injections. If the ulceration be deep, the gentle application of caustic potash, or of the acid solution of nitrate of mercury, will be required. No remedies relieve the reflex irritations so effectually as the pessaries of iodide of lead and belladonna.

Primary syphilitic sores are rarely met with on the cervix or labia uteri. Still more infrequent are they on the walls of the vagina. When they have existed in either of these situations, they have seldom been detected until carefully sought for, owing to the bearer having inoculated one or more men with the poison. Chancres so placed are usually single, and very seldom accompanied by any external sore. Ricord mentions a case in which there was (on one uterine lip) a round ulcer with well-defined and sharp edges and an ash-coloured surface surrounded by a red areola or border; which doubtless was syphilitic, inasmuch as two persons contracted chancres from it. Sometimes the chancre is concealed within the canal of the cervix; so that in any suspicious case, where an abundant muco-purulent discharge is seen issuing from the os uteri, and where one or both lips are much injected, the edges of the opening should be gently everted with a couple of long probes. It is by no means improbable that many cases of concealed chancre have been regarded as examples of gonorrhœa in the first instance; while perhaps such, when presenting secondary symptoms, have gone to swell the list of patients who have manifested constitutional symptoms without having had any primary sore. A true Hunterian chancre on the uterus has the same tendency to spread and to infect the system as one elsewhere, and it requires similar constitutional and local treatment.

Secondary syphilitic affections of the uterus are by no means uncommon. They are very obstinate, and will now and then persist as the sole remains of the syphilitic poison. The chief symptoms are considerable enlargement and increased firmness of the vaginal portion of the cervix; an abundant muco-purulent (or purulent) discharge, both from the cavity of the uterus and from the walls of the vagina; with patches of abrasion, or even superficial ulcerations, upon the labia uteri. Now and then the induration and excoriation are so extensive that the case is mistaken for cancer; an error, however, which will seldom be committed if attention be paid to the general state of the system, and if it be noticed that the uterus is perfectly moveable—not fixed as it is in malignant disease advanced to the stage of even superficial ulceration. The functions of the sexual organs are affected in constitutional syphilis; so that menstrual irregularities are frequent—the flow being usually too abundant. There is also evidence of morbid changes in other parts of the body; particularly loss of hair, sore throat, scaly cutaneous eruptions, and nodes upon the tibia or upon the frontal bone. Should a woman thus affected become pregnant, she will either abort, or she will be delivered (probably prematurely) of a dead child, or she will give birth to an infant who will soon exhibit proofs of a contaminated system. One or other of these results will follow again and again until a radical cure is effected. The cases we read of sometimes of abortion from habit are in nine cases out of ten abortion from constitutional syphilis. The treatment of this disease must be carried out according to the principles already laid down.

Rodent ulcer of the uterus is a severe disease, which has often been confounded with epithelial cancer. The general characters of this peculiar ulceration have already been described in the chapter on diseases of the vulva.

Rodent or corroding ulcer of the os uteri is rarely, if ever, met with before the age of thirty; while in the greater number of cases it seems to have commenced about the time of the cessation of the menses. The ulceration begins very gradually, and extends slowly. As it eats away the affected tissue, complaint is made of pelvic heat and discomfort, with backache or pain about the hips; and there is a thin serous discharge, occasionally streaked with blood. The patient becomes pallid, weak, irritable or anxious, and perhaps thin; while she suffers from indigestion and constipation, from occasional attacks of nausea, and from sleeplessness. After a time, a burning pain often sets in, though it is seldom severe; the suffering altogether, as a rule, being less intense than is experienced in cases of cancer. Attacks of moderate hæmorrhage are not uncommon; sometimes constituting the earliest prominent symptom of the disease—or at all events that one which first leads the patient to seek advice. On making a vaginal examination we shall probably find an irregularly-shaped ulcer with ragged or indurated edges; the sore being more or less excavated, and presenting a dry and glossy or a pulpy surface. The parts adjoining are neither indurated nor unhealthy; while the uterus is moveable instead of being fixed as in carcinoma. Sometimes the whole of the cervix around the os is removed; the destruction of tissue having proceeded to such an extent as to produce a large pulpy cavity, into which the finger readily enters without causing pain. The disease, moreover, eats its way upwards into the body of the uterus, instead of extending downwards; so that the vaginal canal generally remains healthy. Ultimately the entire muscular structure of the uterus may be destroyed; though generally death occurs from exhaustion, or peritonitis, or even from hæmorrhage before this stage is reached.

The diagnosis of rodent ulcer from malignant disease will seldom be difficult, if we bear in mind that in the former there is simply destruction of tissue; whereas, in the latter, we find not only ulceration, but also an infiltration of cancerous matter into the affected part and the surrounding textures. It is chiefly owing to this infiltration that the uterus becomes fixed, and that the walls of the vagina get thickened so as greatly to diminish the calibre of this canal. Moreover, in rodent ulcer there is no affection of the lymphatic glands; neither is any deposition of morbid material to be discovered in distant organs.

The treatment is very unsatisfactory; partly because the disease is remarkably intractable, and partly for the reason that advice is seldom sought until the ulceration has made considerable progress. During the earliest stage, when the cervix alone is affected, excision of this portion of the uterus would probably afford a greater hope of cure than any other proceeding; but at a later period this operation is out of the question. The strongest escharotics have been employed, and almost universally they have proved useless. In fact, we are seldom able to do more than soothe the ulcer with sedative vaginal injections (F. 425), or with pessaries containing opium and belladonna (F. 423); while we attempt to improve the general health by a nourishing diet, by tonics, by cod liver oil, and by sedatives to remove the sleeplessness. As I believe that I have found benefit from the administration of arsenic (F. 52) in rodent ulcer of the cheek, I would recommend a trial of this remedy when the disease has its seat on the cervix uteri.

7. ELONGATION OF THE CERVIX.

The cervix uteri can be divided into two portions, viz.—that part which projects into the vagina, and that which is situated above this canal. Consequently, as M. Huguier has shown, longitudinal hypertrophy of the cervix may be confined to the intra-vaginal portion; or the supra-vaginal part will be alone affected. With regard to the latter I shall merely observe that it is a condition seldom met with, save among laundresses, and women whose occupations entail much standing or walking; that it occurs for the most part in those who have had large families; and that it gives rise to the symptoms which accompany prolapsus of the uterus. It is also often combined with cystocele or rectocele. The os uteri is frequently more dilated than in health; while the sound will be found to penetrate for four, five, or more inches. As I am far from convinced of the necessity for the severe cutting operation recommended by M. Huguier, I would advise the practitioner to be content with palliating the symptoms. Rest for a few weeks, followed by remedies which give tone locally and generally ought to be tried,—such treatment, in short, as the reader will find described in the remarks on prolapsus uteri.

Longitudinal hypertrophy of the vaginal portion of the cervix is attended with a feeling of pelvic weight and discomfort, tenderness on sitting down, and leucorrhœa. There is usually pain during coition, and conception is prevented. On examination, the vagina will be found in its normal position, but more or less filled by the elongated cervix; which part also projects at the vulva. The patient complains either that she has a tumour, or that there is a falling of the womb. If the sound be introduced it will pass readily for perhaps some five inches. Sometimes one lip is more prolonged than the other; but in the worst cases the whole of the vaginal cervix has become equally lengthened.

Amputation of the cervix constitutes the only effectual remedy. To avoid both primary and secondary hæmorrhage it is better to employ the écraseur rather than the knife or scissors. In applying the chain of the instrument around the cervix care must be taken not to wound the bladder; which viscus can hardly be injured if its lower limit be ascertained with the catheter. So also, by not drawing the womb downwards, and by adjusting the chain about a quarter of an inch in front of the union of the vagina with the cervix, the risk of cutting into the posterior peritoneal cul-de-sac will be removed. Subsequently, as the wound heals, the sound should be introduced every third or fourth day, so as to prevent undue constriction of the os uteri.

8. CANCER OF THE UTERUS.

This fearful affection is most commonly observed under the form of medullary ulceration of the lips of the vaginal portion of the uterus. In the small proportion of about 2 or 3 per cent. the infiltration appears to commence in the mucous or muscular coat of the body or fundus of the womb; the disease occasionally running its entire course while confined to this part, and sometimes spreading downward until the whole organ is involved. Probably in one-third of all the cases of cancer which occur in women the uterus is the organ affected. The pathology, causes, varieties, &c., of cancer having been already treated of, it is unnecessary to say anything here upon these heads.

Medullary cancer is very much more frequent than any other variety of malignant disease of the uterus. Examples of scirrhus are not often met with. Cauliflower excrescence, or epithelioma, is also a rare affection; and when discovered, the excrescence is usually found growing from the posterior lip of the uterus. Just as seldom, I believe, an inveterate form of ulcerated epithelial cancer of the lips or interior of the cervix falls under observation.

Symptoms.—In whatever way malignant disease of the uterus sets in, it gives rise to certain prominent symptoms. Briefly, these may be described as consisting of an abundant watery discharge, which is of a dirty pale green colour, and is always offensive, but sometimes so fetid as to render the patient loathsome to herself and almost so to those around her. There are sudden attacks of hæmorrhage, which (contrary to what might be expected) diminish in frequency and severity as the disease approaches a fatal termination. Pain is experienced of the most distressing kind; and though at first this may only come on at night, yet ultimately it gives the sufferer no respite unless relief be afforded by medicine. Troublesome disturbance of the digestive organs is present; being chiefly indicated by frequent attacks of nausea with vomiting, distressing flatulence, and a loathing of food. There is likewise most painful mental depression; together with debility which increases daily, and a rapid wasting of the tissues. It must not be supposed that instances are not sometimes met with where one or more of these symptoms are absent, but they are exceptional cases. Thus, hæmorrhage is often the first indication of the presence of cancer of the uterus, though in a few instances the disease has run its whole course without the loss of any blood. When these symptoms, or most of them, have been present for a short time, the patient's countenance assumes that dingy sallow hue and pinched anxious expression so well known as the cancerous facies. This cachectic appearance follows the symptoms just mentioned and never precedes them, while it occurs the more quickly in proportion to the extent to which the patient has been weakened by the discharges and pain. The only constant symptom which I have observed as a forerunner of the outbreak of uterine cancer is great mental depression; this, of course, being attended with its almost necessary accompaniments of loss of appetite, and restlessness at night.

With regard to those exceptional cases where the disease remains localized in the body and fundus of the womb, the general symptoms do not vary from those just described. There is particularly the same pain, the same abundant watery discharge, the same tendency to hæmorrhage, and the same rapid failure of the vital power. Death usually occurs gradually from exhaustion; but it may take place somewhat unexpectedly from collapse, owing to perforation of the fundus of the uterus accompanied by copious bleeding into the peritoneal cavity.

Diagnosis.—With the great majority of cases the practitioner has no opportunity of making a vaginal examination in the early period of the disease; at that time when the lips of the cervix are merely infiltrated with encephaloid matter, and when they present a moderately hard, uneven, nodulated character. It is but seldom that he is consulted until the disease has far advanced in the stage of ulceration. Then the finger detects readily a more or less deeply excavated ulcer, of a loose spongy character, seated on a tumid hardened base, and surrounded by indurated tissue. The whole womb is felt to be immovably fixed in the cavity of the pelvis; this fixation, which is almost universally present, being partly the result of the infiltration of the connective tissue with cancerous matter, and partly the consequence of early pelvic peritonitis. The vagina is either involved, or it soon becomes so by the gradual infiltration of its tissues; and then the cancerous degeneration extends through the walls of this canal into the bladder, or more rarely into the rectum, or still more rarely into both these parts, so that one large ulcerous cloaca results. As the process of disintegration rapidly proceeds, the lips and cervix become completely destroyed; and the body of the uterus gets converted into a funnel-shaped cavity, with its walls irregularly eaten away, or covered with a fungous vascular growth.

When epithelial cancer assumes the form of the cauliflower excrescence its diagnosis is easy. The peculiar feel of the outgrowth, its fringed or papillary structure, the ease with which its tissues are broken down, the exhausting hæmorrhages of frequent occurrence, and the profuse serous discharges which it gives rise to, clearly point out its nature.

Duration.—The average duration of life after ulceration has commenced is barely two years. Prior to ulceration there are probably no symptoms of any importance to direct attention to the uterus; while when this process has set in the patient tries to persuade herself that her symptoms are due to the change of life, or to some accident. Consequently, advice is seldom sought for until some six or eight months before death. This event is usually immediately due to exhaustion; though it may happen from pyæmia, uræmia, peritonitis, or hæmorrhage.

Treatment.—In very few cases is it possible to do more than attempt to relieve the prominent symptoms as they arise. And in the *first* place the general health is to be maintained as long as possible. Hence the patient ought to be allowed a wholesome nutritious diet; of which milk and cream, raw eggs, and properly cooked animal food must form the chief constituents. Stimulants will be needed in almost all cases; and none will be found more useful than either of the light sparkling wines, good sherry, or pale brandy. Malt liquors almost invariably disagree, by aggravating the dyspeptic troubles generally, and especially by increasing the flatulence. Such tonics as ammonia and bark (F. 371), phosphoric acid in some bitter infusion (F. 376, 379), quinine and belladonna (F. 383), zinc and conium (F. 413), and cod liver oil (F. 389) are valuable in strengthening the system, as well as in alleviating that terrible sinking and feeling of depression which is so generally complained of. Where the stomach is very irritable the use of pepsine (F. 420), of nitro-hydrochloric acid with the dilute hydrocyanic acid (F. 378), or of ammonia and ether (F. 364), gives relief. From one hundred and twenty to two hundred grains of chlorate of potash in a pint of barley water, taken for some days together, will always cure that soreness of the mouth which is often present. Sucking lumps of ice is frequently grateful; or fruit syrups in iced soda or potash water are very palatable. Much good often arises from the free application of extract of belladonna, with the wet compress, over the stomach. Small doses of castor oil, or of confection of senna with the juice of taraxacum (F. 194), or the use of simple enemata will regulate the bowels better than any other aperients. It need scarcely be added, that the purer and more bracing the atmosphere in which the patient lives the better. Moreover, as all ovarian or uterine excitement must prove very injurious, sexual intercourse is to be strictly forbidden, even though the disease be in an early stage. It is in consequence of this tendency to ovarian excitement or irritation that I very rarely resort to the administration of any preparation of steel in cases of cancer uteri; since these remedies, as has already been pointed out, cause congestion of the sexual organs, and increase the pain and tendency to hæmorrhage. I am sure that much mischief is done in many other diseases of the uterus by the indiscriminate way in which ferruginous tonics and chalybeate waters are given.

Then, *secondly*, the practitioner must endeavour to keep the sufferer as free from pain as possible; for while persistent uneasiness causes anxiety and irritability, long-sustained physical suffering will alone suffice to kill. In the early stages a good night's rest may often be afforded by chloral or by giving a couple of pills of henbane and camphor (five and three grains), washing them down with a peppermint draught containing fifteen or twenty minims of the spirit of chloroform. But sooner or later the time arrives when full doses of opium or morphia are needed to allay the anguish. The subcutaneous injection of morphia (F. 314), repeated every eighteen or twenty-four hours, proves very valuable. For exhibition by the mouth or rectum, no preparation is so generally useful as the extract of opium; since, when given in a dose proportionate to the necessities of the case, it seldom induces that subsequent nausea and headache which are so commonly caused by the tincture or the powder. Chloroform, spirit of ether, henbane, Indian hemp, and conium are also useful; and especially so are mixtures containing combinations of these drugs (F. 317). Very frequently, and more particularly when the bladder is irritable, I employ belladonna locally; mixing four or five grains into a pessary with the oil of theobroma, and directing it to be introduced into the vagina every night. When this canal is free from disease, the application to the cervix of a frigorific mixture, by means of a gutta percha speculum, often affords considerable relief. Although the employment of intense cold as a means of cure is quite futile, yet as an adjunct to other remedies for the relief of suffering it is of much value. I have tried the local application of carbonic acid gas, as well as the injection into the vagina of chloroform vapour, but neither proceeding has appeared to be of the slightest service. Sympathetic pains in distant parts are best relieved by the use of strong belladonna liniments or plasters; or by what is often more effectual, the subcutaneous injection of morphia.

In the *third* place, it has always seemed important to me to check the attacks of hæmorrhage as speedily as possible. Independently of the alarm and depression which every flooding gives rise to, I am sure that the loss of blood rapidly hastens the case to a fatal termination, although immediate death from bleeding is of rare occurrence. The general remedies in which I have most faith are gallic acid, the mineral acids, and cinnamon; the acetate of lead, turpentine, and digitalis having only disappointed me. A very useful draught, which may be given every two or three hours during an attack of bleeding, can be made with twelve grains of gallic acid, fifteen or twenty minims of the aromatic sulphuric acid, a drachm and a half of compound tincture of cinnamon, a drachm of syrup of poppies, and water. It must be confessed, however, that local applications are often more valuable, since they more speedily effect our object than medicines given internally. If a small speculum can be used, the bleeding will generally be immediately controlled by inserting into the ulcerated surface a plug of cotton wool, moistened with a strong solution of the perchloride of iron in glycerine; or a plug of simple cotton wool may be gently resorted to, when it is deemed improper to introduce any instrument for fear of rupturing the vascular mass. So also the actual cautery, cautiously applied, will commonly at once serve to close the orifices of the bleeding vessels. But the great disadvantage of these applications is generally that they cannot be employed when they are most wanted; for the floodings come on suddenly and violently, to the patient's great alarm. I frequently, therefore, instruct the nurse how she may use an injection of alum and gallic acid, or of infusion of matico, under these circumstances; explaining that it is only necessary to have the hips well raised by pillows and then to inject with a common syringe, or even to pour into the vagina through a funnel a small quantity of either of these astringents, in order to moderate the discharge of blood, if not to control it entirely. Sometimes a pessary made with as much tannin as can be held together by thirty grains of cacao butter, forms an effectual styptic. The use of ice to the vulva may also be recommended.

And *fourthly*, it is necessary to mitigate the horribly offensive odours of the discharge; by accomplishing which we may generally also succeed in lessening the quantity of the serous flow. This duty will not be thought unimportant by any practitioner who has had the misfortune to see a few neglected or badly-managed cases. Now to begin with, it is advisable (at least as far as the women seen in the hospital out-patient rooms are concerned) to recommend free ablution twice or thrice daily with tepid water. Then, when we can depend upon injections being gently but effectually used about twice a day, with a proper syphon-syringe, we may order from twenty to thirty grains of the crystals of carbolic acid to the pint of water; or twenty grains of chloride of zinc, or one drachm of creasote, in the same quantity of fluid as for the acid. The permanganate of potash (grs. 20—40 to the pint of water) makes a capital injection. So does simple tar water; obtained by stirring a pint of tar with a gallon of water for fifteen minutes, and then decanting. In several instances comfort has been derived from the use every night of a pessary containing extract of logwood and cacao butter (thirty grains of each); an application, the power of which is not deteriorated by having combined with it belladonna or morphia. And, lastly, I have known ladies attempt to prevent the fetid smell from being perceptible to others by padding the vulva with small muslin bags of vegetable charcoal; a practice which is only of any value in exceptional cases and under peculiar circumstances.

Now the measures which have just been described may be said to be those which are to be practised in almost every instance of uterine cancer; and it is certain that by their skilful adaptation to the exigences of each particular case much good may be done. But once in a way it happens that we see the patient when the affection is in an early stage, or when it assumes the form of a polypoid excrescence, or when it appears limited to the cervix uteri. Under these circumstances it becomes an anxious question whether some more decided plan of treatment may not be useful; whether something cannot be done to eradicate the disease completely, or at least materially to check its progress? The truth must unfortunately be confessed that here the art of the physician, for the most part, fails him. Uterine cancer seems really to be much more virulent and less amenable to treatment than cancer of the breast. With regard to specific remedies in cancer of the womb, I can only say that I have never seen anything approaching to permanent benefit from their employment, but Dr. Wynn Williams claims to have removed uterine cancer effectually and permanently by means of a strong solution of bromine. Powerful escharotics, repeatedly and thoroughly applied to the diseased surface, have never seemed to me to retard the disease. And the same disappointment follows excision of the neck of the womb; whether this operation be performed with the écraseur, the knife, or the ligature. If there are any exceptions to this statement, it is in the case of epithelial growths (cauliflower excrescence); but even here I fear that in almost all instances the good which may be done is merely temporary. In only one instance can I persuade myself that I effected a cure by amputating the cervix, and in this instance the patient was lost sight of twelve months after the operation. Yet I do not consider that this proceeding is altogether to be condemned. It will possibly in a few instances prove beneficial; and it may certainly be said that neither in my own practice, nor in that of a few other physicians which I have had the opportunity of seeing, has it done any mischief. It gives the patient the inestimable comfort of hope revived; so that for a few months, by controlling the symptoms, it greatly lessens anxiety if it does not afford complete peace of mind. The misfortune is, that the cases are so rarely met with in which there is a fair chance of this operation succeeding; since, for reasons already insisted on, patients rarely apply for advice in the early stages of uterine cancer.

Extirpation of the entire uterus has been practised on some twenty-six occasions for the cure of cancer; but I am only acquainted with one well-authenticated report of its having been really successful, though in four instances the patient recovered from the operation. In the successful case, the woman remained well for twenty-five years. But it must be remembered that there was a previous procidentia of the organ, so that the operator, Conrad J. M. Langenbeck, had a comparatively easy task; while, without being hypercritical, a doubt may be suggested as to the correctness of the diagnosis. The details of the case are given by Professor Max. Langenbeck in his thesis *De totius Uteri Extirpatione*, Göttingen, 1842. One successful result, however, from a very dangerous proceeding cannot outweigh a number of failures; failure, be it remembered, implying death within forty-eight hours in fifteen out of twenty-two fatal cases. Hence it is almost unnecessary to say, that no practitioner in the present day would be justified in following the example of the elder Professor Langenbeck, Recamier, and Blundell with regard to this operation.

It occasionally happens that cases of cancer of the uterus complicated with pregnancy are met with; and when the gestation has not advanced beyond a few months, it becomes a question of some moment as to whether a miscarriage should be induced. There is but little doubt that, as a general rule, it is best to take the proper steps for emptying the uterus at as early a period as possible. The process of parturition, at or near the full term, is one of considerable suffering and risk when the cervix is infiltrated with cancer; two great sources of danger existing—viz., the liability to hæmorrhage and to rupture of the uterus. Sometimes even delivery by the natural passages after the seventh month is quite impossible; and two physicians in this country have had to resort to the Cæsarian section under these circumstances. For further remarks upon this subject the reader may refer to the description of a case of multiple cancer complicated with pregnancy, in which I induced abortion, for reasons fully stated in my paper.*

VIII. UTERINE TUMOURS AND OUTGROWTHS.

The tumours to be considered in this section are,—fibroid tumours, with a short notice of recurrent fibroids; uterine polypi; and cystic degenerations of the uterus.

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* *Transactions of the Obstetrical Society of London*, vol. iv. p. 243. London, 1863.

1. FIBROID TUMOURS.

Of all the organic diseases of the uterus which first manifest themselves during the period of sexual vigour, the non-malignant tumours are the most common. In the present section I intend to speak only of the non-pediculated fibroid bodies—commonly known as fibrous tumours of the uterus.

Pathology.—Fibroid tumours may be developed in any portion of the uterus. According to their position they are often classified as sub-peritoneal or surface tumours, when just beneath the peritoneum; interstitial or intra-mural tumours, when imbedded in the uterine walls; and sub-mucous or intra-uterine tumours, when they are pressed into the cavity of the womb. Fibroids consist of outgrowths of uterine tissue. The dense and firm muscular structure of the uterus is made up of bundles of smooth or unstriped muscular fibres, arranged in layers; together with areolar or connective tissue, bloodvessels, lymphatics, and nerves. And so we find that uterine tumours are composed especially of unstriped muscular fibre, an element which is wanting in fibrous tumours. Hence the use of the term "fibroid" in preference to that of "fibrous" as ordinarily employed.

Fibroid tumours are met with at all ages after puberty, though they occur most frequently between the years of 25 and 48. The earliest age at which I have observed such a growth has been 18, the woman being married. It is very probable that these tumours occur equally in the married and single, in the sterile and fruitful. My own notes of cases of true uterine fibroids, show a preponderance of married sterile women; but the experience of one practitioner is of little value on such a point. The following table, however, gives the number of cases of both non-pediculated fibroid tumours and of polypi, of which I have kept a record, between the 1st January, 1851, and the 1st January, 1869, exclusive of fifteen doubtful instances, where the diagnosis was either imperfect or the statements of the patient seemed unreliable:—

	Fibroids.	Polypi.
Virgins	31	13
Married and sterile	49	10
Been pregnant, but always aborted	7	1
Borne one or more children	25	22
First pregnancy while under treatment	1	0
	113	46

Fibroid tumours vary in size from that of a small nut, to that of a fœtus at the full term of gestation: indeed, their bulk is sometimes much greater than that of a newborn infant. They commonly weigh one or two pounds, but they have been found frequently as heavy as six or eight pounds; while extraordinary cases are recorded where they have reached thirty, forty, and even seventy pounds. In form they differ considerably, but usually they are round, or pear-shaped, or irregular and lobulated; although in consequence of pressure they may attain every imaginable figure. Now and then we find a large tumour occupying the whole fundus of the uterus, with an outgrowth of a most irregular shape attached to the uterus by a pedicle. This was the case in a patient who was sent to me to be relieved of an abdominal "floating tumour." By careful manipulation no difficulty was experienced in making out the thick pedicular attachment to the posterior wall of the uterus, which organ was greatly enlarged by an intra-mural fibroid. Occasionally the pedicle in these cases gets ruptured, and then the growth remains in the abdomen as a moveable foreign body. When the cavity of the womb becomes much enlarged by a fibroid projecting into it, the uterine walls get hypertrophied, while the sinuses may undergo development as in pregnancy. Under the influence of congestion (such as occurs at the menstrual periods) the walls of one or more of these venous canals may get ruptured; blood being poured out until a coagulum forms, or the opening heals, or the uterine contractions compress the bleeding orifice against the tumour.

These growths may exist alone or in combination with other diseases: it is not uncommon to find a fibroid and a mucous polypus in the same case. Occasionally, with a fibroid of the womb there is a cystic tumour of the ovary. Fibroids will also be single or multiple. Very often there are three or more separate tumours; and in one specimen which I removed from the body of an old woman, as many as nine distinct outgrowths from the external walls of the uterus could be counted. In the Hunterian museum a preparation (No. 2674) may be seen in which eight or nine large fibroids are present in the uterine walls, all of them projecting upon the peritoneal surface; the largest growth retaining only a narrow base of attachment to the fundus of the uterus, while another somewhat smaller is fixed to the side of this organ by a flat band.

The tumours recognised as *recurrent fibroids* differ from ordinary fibroids inasmuch as if removed a new growth forms at the site of the old one; while all such bodies manifest a tendency to ulceration, followed by free discharges of blood and fungous degeneration. Recurrent fibroids destroy life with almost as much certainty and rapidity as scirrhus does. Fortunately, they are very seldom developed in the walls of the uterus.

Symptoms.—The symptoms produced by fibroid tumours are often neither important nor well-marked; and indeed these growths not unfrequently exist without giving rise to a suspicion of the presence of any uterine disease. But on the other hand, when of a size sufficient to be detected through the abdominal wall, they are usually the cause of menstrual disturbance; of a leucorrhœal discharge; of a dull, aching, or throbbing pain in the back—especially all over the sacrum; of a sense of weight and bearing-down in the pelvis; of cramp or numbness in one or both thighs; of a difficulty in evacuating or in holding the urine; and of constipation, with hæmorrhoids. Just as pediculated fibrous tumours (commonly known as uterine polypi) are almost always attended by one very prominent symptom, viz., hæmorrhage; so, with a little latitude, it may be said that the same happens in sub-mucous tumours merely projecting into the cavity of the uterus. When the first symptom of the existence of a fibroid is a sudden attack of hæmorrhage, the patient not unfrequently tries to persuade herself that she has been pregnant, and aborted; but the practitioner must not be misled by her statements or opinions. He will distinguish the true nature of the disease by learning that the loss of blood has probably been excessive; that the hæmorrhage has returned more than once without warning, and without being accompanied by uterine contractions or pain; and especially by finding that the tissue of the cervix is firm, and the os thin and small, instead of being relaxed and swollen and patulous as after abortion. Very frequently, especially with sub-mucous tumours projecting into the cavity of the uterus, the patient first has her attention directed to the womb by noticing that the menstrual discharge is more abundant than usual, that its duration is greater, that it is attended with clots, and that its cessation is followed by leucorrhœa. The monthly periods also recur more frequently than is natural; they are accompanied with great pain in the back and thighs, and bearing-down or dragging sensations; there may be expulsive efforts, simulating labour pains, sometimes occurring only with the catamenial flow, and sometimes coming on in the intervals with more or less frequency; while during the time the courses continue, and even for some few days before and afterwards, the patient is incapacitated from following her usual duties. Now and then there is actual flooding.

On making a vaginal examination we shall generally find the weight of the uterus increased, while its mobility is somewhat diminished; the vagina also being lessened in length. If the tumour be in the cavity, the os may sometimes be felt quite patulous, and the tumour projecting between its lips; but more frequently the mouth of the uterus is closed, and the cervix absorbed into the substance of the walls, so that we feel merely a rounded body with a slight depression and opening at its lowest part. When the tumour occupies the posterior wall it often produces retroversion of the uterus; and consequently the fundus of this organ then lies upon the rectum, while the cervix is pushed forwards and upwards under the pubic arch. Supposing the growth to be in the anterior wall, the uterus will frequently be found anteverted; that is to say, it will lie across the pelvis with its fundus on the bladder, and its os looking directly towards the sacrum. Instead of retroversion or anteversion, there may merely be retroflexion or anteflexion; or the tumours may even be large and heavy, without causing any uterine displacement whatever. Provided that the practitioner is certain of the non-existence of pregnancy, he will derive great assistance in forming a positive opinion on the nature of the growth and its exact position from the use of the uterine sound. When this instrument is introduced into the healthy uterus, it passes for two inches and a half; and by it (without any rough manipulation) the organ can be slightly elevated, or turned to either side, or bent backwards or forwards. In most instances of fibrous tumour the cavity is elongated; while if the tumour be in the walls, or broadly attached to them, the sound appears to enter the mass so that the uterus cannot be separated from it, both can only be moved simultaneously, and at the same time the womb is found to have lost its healthy mobility and freedom.

Whatever may be the cause of uterine enlargement—whether it be a tumour or retention of the catamenia, the breasts generally become somewhat developed and tumid; while sometimes the areola also darkens, or the follicles increase in size and number. But it is only in pregnancy that the nipples and the areolæ undergo all those peculiar changes which are so characteristic of this state; for in no other cases do we find, combined with the development of the glands, enlargement of the follicles and an increase in their number, œdema of the areolæ, moisture of these parts, and a gradually increasing deposit of pigment in their tissues.

If we practise auscultation over a fibroid tumour we shall very frequently detect, synchronous with the pulse, a loud souffle; which may sometimes be due to the pressure of the growth on the aorta or iliac arteries, but which I believe generally has its seat in the vessels of the enlarged uterus. This murmur might lead to the case being mistaken for pregnancy; but unless this condition coexist, we shall of course be unable to discover the fœtal heart, or anything approaching to fœtal movements.

Terminations.—Fibroid tumours of the uterus are generally benign and harmless; many patients having been known to live for twenty, thirty, or even more years after the growth has first manifested itself. In such cases, the tumours commonly attain a certain size, and then remain stationary; giving rise to no symptoms beyond what may be produced by their bulk or their pressure upon other organs. Where a fibroid induces severe attacks of hæmorrhage, however, the results are likely to be more serious, though death very seldom occurs from this cause. In only one of my cases has death taken place from anæmia due to the frequent floodings; the fatal event happening nearly seven years after the first abundant bleeding. The constant leucorrhœal discharge will oft-times induce weakness, but I have never seen anything like a dangerous set of symptoms from this source.

Fibroids occasionally undergo a cystic degeneration; one or several cavities, containing a limpid fluid, being developed in their centres. I do not believe, however, that the whole tumour can thus be converted into a simple cyst, as some authors seem to imagine. In the cases which have led to this idea being entertained, it is probable that one or more fibroids have coexisted with a cystic growth. Now and then these fibroids become swollen, softened, and œdematous; either as the result of great congestion, or possibly of a low form of inflammation. In the same way, an abscess may form in the interior of the tumour; an unfortunate result which has proved fatal in most instances where it has happened. A more favourable event is that of fatty degeneration; a change which occurs much more rarely than might be expected. Where a fibroid tumour gives rise to ascites the symptoms necessarily assume a more serious character.

That fibroids are occasionally partially absorbed is I believe certain; while it is highly probable that they may be entirely removed in this way, especially after the permanent cessation of menstruation, quite independently of any treatment.*

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* The following case affords a striking example of partial absorption synchronous with the climacteric change:—Mrs. T., 42 years of age, came under my care on the 15th October, 1856. She has been married eight years, and never been pregnant. The catamenia are irregular: has leucorrhœa. Has had some severe attacks of flooding,—one in August, 1854, a second in October, 1854, a third in January, 1855. Then for nine months there was no excessive loss; but at the end of this time the hæmorrhage became so abundant that she had to be admitted into Charing Cross Hospital. She did not detect any abdominal tumour until the Christmas of 1854. Since then, has rapidly increased in size, so that now she is quite as large as a woman at the full term of gestation, the uterus reaching to the ensiform cartilage. On making an examination, the vagina is found contracted, the uterus high up in the pelvis, while presenting at the os uteri (which is as large as a penny piece) is a hard fibroid tumour. This tumour is evidently too large to be drawn through the pelvic cavity. As there were no urgent symptoms her general health was improved with tonics, &c. In January, 1859, the tendency to flooding returned, and it seemed desirable to remove the tumour if possible. I thought that by ligaturing a portion of it, there would be a possibility of getting away the part when dead, and that by repeating the operation the whole might ultimately be removed. All attempts, however, to pass Gooch's cannulæ, armed with whipcord, failed; owing to the presence of firm adhesions between the front of the tumour and the uterus. Drs. Tyler Smith and Graily Hewitt, who were present, allowed that they had rarely if ever seen so large a tumour. After this attempt the flooding lessened in frequency again. Twice or thrice there was a severe loss; but it was generally checked in a day or two by perfect rest, and the administration of gallic acid with cinnamon. I frequently saw this patient afterwards up to the year 1865. The tumour had long been decreasing in bulk: there had been no hæmorrhage for many months, the catamenial periods having apparently ceased about the beginning of 1864; and the abdomen was then of natural dimensions, the tumour being reduced to about the size of the fist. 19th November, 1869.—This tumour has got larger again. There has been no bleeding since December, 1864, until this week. Has had a discharge of blood for four days. Tumour has again got much larger.

The sub-peritoneal and sub-mucous fibroids not uncommonly become gradually pediculated, so that in the latter case they may be removed like other polypi. But in both instances it has occasionally happened that the tumour has become entirely detached from the uterus; the growth, when of the sub-peritoneal kind, having been found with an attachment to one of the abdominal viscera. It is even said that a fibroid may remain loose in the cavity of the peritoneum, and be nourished in the same way that a loose cartilage in a joint is kept from decay. I have never, however, seen any example of such an occurrence.

And, lastly, a fibroid may undergo calcareous degeneration,—a process which is probably allied to that spoken of as ossification of the coats of the arteries, such as is met with in old people. Whether these tumours ever suffer from malignant degeneration, is a disputed point. I have met with three or four cases where the most careful local examination could detect nothing but what appeared to be true fibroids; though the general symptoms, and the fatal results, proved that the tumours were cancerous. But whether they were so from the beginning, or whether they were originally fibroids which became infiltrated with cancer, I cannot say.

Treatment.—As a general rule, I believe that the less we interfere with fibroid tumours, the better will it be for the patient. It is exceedingly doubtful if drugs have any power in producing absorption of these bodies, or even of arresting their growth. I have watched the effects of mercury, iodine, iodide of potassium, chlorate of potash, and liquor potassæ, when given by myself or others, and I have never seen these remedies exert the slightest favourable effect. I question very much whether the chloride of calcium will prove of any real value; although Dr. M'Clintock has met with one case which got well, after taking the liquor calcii chloridi of the Dublin Pharmacopœia (the now officinal chloride of calcium, in solution) for two years. The chloride of calcium, with full doses of conium, continued steadily for several months, has now and then seemed useful. In the few instances where I have tried this remedy, it has appeared to do neither good nor harm. The same remark applies to the chloride of ammonium, which I have used perseveringly. The bromide of potassium has also been largely employed, and all that I can say in its favour is, that one patient became pregnant while taking it.

Remembering therefore the low vitality of these bodies, that they frequently are only productive of mechanical inconvenience, that they will often attain a certain size and then remain stationary for years, and that their partial absorption or degeneration occasionally takes place at the climacteric change, we had better be content with limiting our treatment to the palliation of any important symptoms which may arise. The danger of attempting a radical cure, either by enucleation, or by gouging the growth and scooping away portions, or by opening the abdominal cavity and extracting the tumour, is so great that I should be loth to recommend any such proceedings. It is certain that even in the case of a pediculated sub-peritoneal fibroid, the risk of the abdominal section and removal of the tumour is much greater than that of ovariotomy; although it is not easy to see why it should be so. I am of course aware that large uterine tumours have been extirpated by opening the abdomen, and that in the hands of Dr. Clay and M. Kœberle and two or three American surgeons such operations have been now and then successful. Dr. Storer has removed the uterus and both ovaries by abdominal section, the patient recovering. But exceptional cases can form no guide for general practice: otherwise the so-called "triumphs of obstetrical surgery" will have a most disastrous influence. Of 29 cases in which this operation had been performed, recorded up to the end of 1868, 22 had proved fatal.

One of the commonest symptoms we have to treat is menorrhagia, which occurs most frequently in the submucous and next in the intramural fibroids. The most efficient drugs are, corrosive sublimate (F. 27); gallic acid alone, or in combination with the aromatic sulphuric acid and cinnamon (F. 103); the oxide of silver with Indian hemp (F. 47); and the iron alum (F. 116), which is particularly useful where there is much anæmia. But it sometimes happens that all astringents prove inefficient, and we must then resort to surgical measures. An excellent practice is that recommended by Dr. M'Clintock, Mr. Baker Brown, and M. Nélaton; who all allow that a free incision of the os and cervix uteri is generally followed by a remarkable decrease in the hæmorrhage. According to Mr. Brown the division of these parts permits the fibres of the body of the uterus to contract upon the contained tumour so as to compress the vessels. Whatever the explanation may be, however, I can confirm the statement that the operation is frequently very efficacious in preventing metrorrhagia. Where the fibroid can be reached, Dr. Atlee recommends a free incision into the most exposed part of the tumour; which is to be practised by passing a bistoury, upon the finger, along the vagina into the uterine cavity. The incision is followed by a slight gush of blood, but as the cut ends of the vessels quickly retract and get closed by clots, the hæmorrhage entirely ceases. According to this gentleman, therefore, the source of the discharge is not in the uterine walls, but in the vessels of the membrane covering the tumour.

When a fibroid is confined to the true pelvis, and by its pressure is interfering with defecation and micturition, or causing severe cramps, these mechanical inconveniences may possibly be removed by pressing the growth upwards into the false pelvis. The difficulty is that there will perhaps be adhesions, though they cannot always be detected; and if these be ruptured fatal peritonitis may ensue. Moreover, it is by no means easy to draw the line between judicious and injudicious force. In one instance where I succeeded in efficiently raising the tumour, I certainly remember that an amount of force had to be employed which many would have condemned. However, great relief was afforded without any mischief resulting. Sometimes, where the pains, &c. are due to temporary congestion of the growth, or to œdema, the administration of the bromide of potassium (F. 42) will remove these complications; or they may be subdued by the use of the Kreuznach waters (F. 484), the patient's system being at the same time invigorated by the change of air and the regular living adopted at this bath.

2. POLYPUS OF THE UTERUS.

The term polypus [from Πολὺς = many + ποῦς = a foot] is by general consent here employed to designate those tumours which are attached to the inner surface of the uterus by a pedicle or neck. They differ much in size; sometimes being scarcely larger than a pea, while on other occasions they have a bulk equal to that of the adult head. Moreover, they are either found occupying the uterine cavity, or they may be in the vagina and merely attached to the fundus or body or cervix of the uterus by their pedicles.

Pathology.—Polypi vary in structure, but it is probable that they may all be referred to one of the three following species—viz., the fibroid, the mucous or gelatinous, and the placental.

The *fibroid* have the same structure as the tumours of the uterus already described; that is to say, they are essentially outgrowths of the uterine muscular tissue. I believe that it is not an uncommon occurrence for a common intramural fibroid gradually to assume the polypoid form, as it increases in size, and gets forced more and more into the uterine cavity by the muscular contractions. These contractile efforts are in fact, attempts on the part of the uterus to throw off the tumour, and they might be divided into three stages—in the first they render the growth polypoid; in the second, they expel the tumour into the vagina, possibly with all the symptoms which attend a natural labour; while in the third, they would cause rupture of the neck of the fibroid, did not art generally step in and divide this part.

The *mucous* or *gelatinous* or *cellulo-vascular* polypi spring from the canal of the cervix. They are composed of delicate bundles of fibro-areolar tissue, covered with mucous membrane containing numerous bloodvessels. They are often very small, perhaps seldom exceeding a walnut in size; but notwithstanding their minuteness they frequently give rise to attacks of free hæmorrhage, and cause the catamenial periods to be unduly prolonged. It is probably true, as Dr. Hassall has conjectured, that these growths sometimes have their origin in enlarged villi of the cervix. In the Hunterian museum there are four preparations (Nos. 2660-2663) very clearly showing the form and attachments of these polypi.

Placental polypi are produced by portions of after-birth left in utero, after an abortion or a labour at the full term. The profession is indebted to Dr. Carl Braun, of Vienna, for showing the great importance of retained masses of placenta in the pathogenesis of uterine polypi. This eminent physician and pathologist believes that at least the majority of the so-called fibrinous polypi are the remains and products of pregnancy; and his opinion has been especially confirmed by Dr. Stadfeldt in a paper which should be read by every obstetrician.* From this essay it appears that Dr. Braun rests his views on five cases, in which at a variable interval after delivery there was violent hæmorrhage from the uterus. On examination, the polypi were found; in four instances being extracted with the finger, while in the fifth the tumour separated spontaneously. On investigation, these bodies distinctly exhibited the composition of the placental tissue. He moreover describes two preparations in the Vienna Museum, in which may be seen polypoid tumours in puerperal uteri; and these tumours consist of distinctly recognisable placental remains. It is of course no new fact that a portion of placenta may be left in utero after the removal of the greater part of this structure, and that while so retained it may be the cause of serious attacks of hæmorrhage. But it has not previously been shown that such placental débris can assume the external form of a polypus, and may, even years after delivery, give rise to all the symptoms of a common polypus.

Symptoms.—The most important symptom produced by a polypus is profuse menstruation. After a time there are likewise irregular and frequent discharges of blood, often amounting to attacks of flooding. The tumour also, by its irritating effect upon the mucous lining of the uterus or vagina, gives rise to an abundant leucorrhœal discharge; which discharge is often sanious, while in other respects its character varies according to its seat. Moreover, as the growth increases in size, so by its pressure it irritates the pelvic viscera; and we have complaints of frequent micturition, tenesmus, backache, &c. Occasionally also, there are paroxysms of pain, such as attend upon abortions. Where the growth has only formed after the change of life has occurred, then a discharge of blood will probably be the first symptom manifested. Oft-times under these circumstances the bleeding does not return for a considerable period; while it is seldom as abundant as in younger women. So true is this, that in maiden ladies over the age of fifty the polypus can often be left alone; little risk resulting from such a practice, while it saves a probably over-sensitive woman from much mental and physical suffering.

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* "On Placental Polypi and Placental Remains in the Cavity of the Uterus. By Dr. Stadfeldt, of Copenhagen. Translated from the *Hospitals-Tidende* for the 25th December, 1861, by William Daniel Moore, M.D." *The Dublin Quarterly Journal of Medical Science*, vol. xxxvi. p. 491. Dublin, 1863.

An interesting case of fatal hæmorrhage from placental polypus has also been recorded by Mr. John S. Beale (*Lancet*, 23rd April, 1864). At the autopsy, on opening the uterus, a fleshy tumour seven inches in length, and surrounded by a coagulum weighing over twenty ounces, was exposed. The tumour was attached by a pedicle, over one inch in diameter, to the right side of the fundus uteri. This pedicle was about three inches in length, and so firmly adherent that the uterine wall was injured in its removal. The tumour itself was about three inches long, by seven broad; and it consisted of a glossy, soft, even mass, which presented the cotyledonous structure (only smaller) of the placenta, with the usual spongy areolar tissue.

The foregoing symptoms are of little value, except in so far that they show the necessity for a digital examination. On instituting this, all doubt about the nature of the case is removed when the practitioner finds the tumour in the vagina, or feels it presenting at the dilated orifice of the uterus, while at the same time the sound can be made to enter the uterine cavity for two inches and a half. But frequently there is no body present in the vagina, and the os uteri is closed. Sometimes, under these circumstances, the cervix is discovered much shortened, and the uterine body more or less enlarged; or there is retroflexion or anteflexion of the uterus, or even greater displacement; or the position of the womb is normal, while the educated finger feels that this organ is heavier than natural, with its body round and increased in size. The investigation must therefore be pursued another stage with the aid of the uterine sound; by which instrument the size of the uterus will be learnt, and the presence of any moveable substance in the cavity be ascertained. If still there be doubt, the os and cervix ought to be dilated by tents, in the manner presently to be mentioned, so that the interior of the uterus can be explored by the finger. I have made several attempts to obtain a view of the uterine cavity by means of Dr. Cruise's endoscope; with which instrument deep cavities hitherto looked upon as inaccessible to sight, have been satisfactorily examined. In the cases under consideration, however, the results have been negative.

Terminations.—So long as the polypus remains either in the uterus or vagina there is, as a general rule, considerable danger from the hæmorrhage. This is invariably true with regard to women under the age of forty-eight or fifty. Although the bleeding very seldom destroys life directly, yet it often goes on to such an extent as to induce severe anæmia; while it may even lay the foundation for some tubercular affection. And it is important to remember that the amount of hæmorrhage is in no way dependent upon the size of the tumour; a polypus no bigger than a hazel nut often giving rise to as much flooding as a very large growth. This circumstance has been said to afford support to the view that the bleeding takes place from the uterus, and not from the tumour as some imagine; but it is very possible that the blood is poured out both from the tumour and the uterus.

Very rarely the tumour has set up inflammation and ulceration of the uterus; the morbid action having progressed to such an extent, in a few instances, as to destroy adjoining structures. In this way a portion of the uterine wall has been gradually eaten away; this destruction being followed by the polypus making a passage for itself through the coats of the bowel, or of the abdominal wall, or of the perineum. A termination of this kind is, of course, very rare; but it serves to show how extensive the irritation must be in these cases to be capable, even once in a way, of setting up such destructive inflammation.

Treatment.—I do not think it necessary to speak here of the remedies which may be employed to relieve the symptoms, because it is mere trifling to waste time with astringent injections, blisters to the sacrum, and astringent medicines. So long as the tumour remains, it does so to the jeopardy of the patient. Undoubtedly in some cases a polypus will degenerate, and a spontaneous cure result. Or the pedicle can be fractured by strong uterine contractions forcibly expelling the growth entirely out of the sexual organs. But either of such events is too exceptional to influence our practice generally. Hence the real question is, how the polypus may be best removed?

When the tumour is in the vagina, I believe that no operation in obstetric surgery is easier to perform, or less likely to be attended with dangerous consequences, than that of cutting through the pedicle with a pair of curved blunt-pointed scissors. I have not only thus removed almost all the growths of this kind which have fallen under my observation, but I have seen other physicians adopt the same practice with the best results. There has been, in short, neither hæmorrhage nor any other unfavourable symptom. At the same time, if the practitioner be nervous, or if the neck of the growth be unusually large, there can be no harm in using the écraseur armed with copper wire, in place of the scissors or bistoury. But to place a ligature round the neck of the tumour, and gradually to tighten this cord until at the end of some days the semi-putrid polypus comes away, seems to me a practice which can no longer be defended. There is but one caution to be added with regard to excising the tumour, and it is this. That before using any cutting instrument the sound must be fairly introduced into the uterine cavity; so that the practitioner may feel thoroughly convinced that he has to deal with a tumour, and not with an inverted womb.

Now although nothing can be more simple than the treatment of uterine polypus when the growth has been expelled into the vagina, and is merely attached by a pedicle, yet the removal of the tumour is not so easy when it is still retained in utero. Under these circumstauce, the os and cervix have to be thoroughly dilated with sponge or sea-tangle tents (F. 426). The best plan of using these instruments is as follows:—The patient, having had her bowels freely operated on a few hours previously, is to lie at the edge of the bed in the ordinary position for labour. A sea-tangle tent, of such a size that it will pass easily, is then introduced up the whole length of the uterine cavity. This tent should be left for twenty-four or forty-eight hours, the latter being preferable. At the end of the time it is removed, and one of a larger size introduced; this being taken away in its turn, and another used, until the finger will readily enter the uterus. The tumour and its attachments can then be thoroughly explored; and if it appear probable that the growth may be successfully removed we ought to proceed to induce further dilatation, should this seem to be required. I am sure it is bad practice to attempt extraction of the polypus until the os uteri be sufficiently dilated. For the stretching of the os at the last stage, a sponge is better than a tangle tent; since the former expands more readily than the latter, and does not exert as much force. When sufficient room has been obtained, I have generally removed the tumour by torsion, or by gradually breaking down its attachments with the finger nail; but if there be a distinct pedicle, and if it be thick, then it had better be divided by the wire écraseur. Should there be any difficulty in introducing this instrument, a whipcord ligature may be applied by means of Gooch's cannulæ provided with a windlass; so that the ligature may be made to cut through the neck of the growth at once, or at the latest on the following day. The growth being separated, it can readily be withdrawn by seizing it with the vulsellum forceps; patience and skill being employed instead of force. The patient had better remain in bed for a few days after the operation, until the uterus seems to have contracted to its normal size. Since I published some cases illustrative of this plan of treatment about eight years ago,* I have adopted it in several other instances with success. The practice, however, is not devoid of danger. In one of my cases there were two intra-uterine growths of considerable size. One of these, the largest, I removed without much trouble, and with great relief to the patient's sufferings. Some months afterwards, on attempting to separate the second growth from its attachments, death took place, apparently in consequence of pyæmia.

3. CYSTS OF THE UTERUS.

Unilocular cysts, or closed sacs, filled with mucus or serum, are occasionally developed either in the substance of the uterus, or beneath the internal mucous coat, or just under the external serous covering. Sometimes one portion of the uterine structure is invaded by a cystic growth, while another part is the seat of an ordinary fibroid tumour.

* *The London Medical Review,* vol. ii. p. 3. London, 1862.

The *mucous* cysts have their origin in the follicles about the os and cervix uteri; and they are found to have their seat immediately beneath the lining membrane, or in the muscular substance. They are either single, or several can be developed; and their size may vary from that of a large pin's head to that of a small pear. Not uncommonly the lips of the cervix are studded with them. They are occasionally found projecting through the os; but they may also, instead of passing downwards, extend upwards into the cavity of the womb. This latter direction is possibly most commonly taken in the cases of women who have borne several children; obviously because the resistance which is offered to such a route is less than in instances where fecundation has only occurred once or twice some long time previously. After such cysts have passed into the cavity of the uterus, their attachment seems occasionally to become pediculated; while subsequently they may be expelled with all the symptoms which attend upon an abortion. On one or two occasions where this has happened, I have been so struck with the resemblance borne by the tumour to a small hydatid cyst, that search has been made for the echinococci heads; though, of course, nothing of the kind has been discovered. The vesicles or cysts which not very unfrequently result from a morbid alteration of the villi of the chorion, and which lead to the formation of the "vesicular mole," might likewise, if they were expelled singly, give rise to an erroneous diagnosis; but as they almost always come away in masses, as their formation is attended with (or preceded by) the symptoms of pregnancy, and as the indications of their presence are well marked and characteristic, it is scarcely possible for them to be mistaken for the cysts under consideration.

In an excellent essay on "Cysts of the Womb," by M. Huguier,* it is shown that each of these growths has two envelopes:—First an internal one, which is smooth, polished, transparent, excessively thin, and very vascular; and secondly, an external membrane, composed of elastic areolar tissue, thicker than the first tunic, and like it transparent. The fluid in these bodies is albuminous, unctuous to the touch, stringy, alkaline, clear and transparent,—in short it resembles the mucus secreted by the follicles of the cervix. Occasionally it is slightly opaque, and sometimes it contains one or two little greyish or yellowish-white bodies which vividly reflect the light. A microscopic examination of the liquid by MM. Huguier and Robin, has shown that it contains a quantity of molecular granules, as well as spherical or ovoid granular globules formed by the agglomeration of the molecular particles. The uterine tissue around the cysts, as well as the mucous membrane covering them, is generally somewhat congested; while the entire cervix is frequently hypertrophied.

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* *Mémoires de la Société de Chirurgie de Paris*, tome i. p. 253 et seq. Paris, 1847.

The formation of these cysts takes place more rarely than might be expected. Their growth is slow; while as they occupy parts of feeble sensibility they give rise to no appreciable symptoms in the early stages of their development. But when they have attained a certain size they produce uterine leucorrhœa, irregular with too abundant menstruation, and often attacks of hæmorrhage. Pains in the loins and upper part of the thighs are complained of, frequently there is a sense of bearing down, and in exceptional instances the growth is thrown off with the symptoms which are produced by the expulsion of an early ovum or of a polypus. An examination may fail to detect the cyst if it be situated in the substance of the uterus, or if it project into the canal of the cervix without causing dilatation of the os uteri; but where the latter is patulous, or where the cyst projects from the external surface of the neck, it will be found as a somewhat supple and imperfectly fluctuating, or as a firm and elastic body. When the cyst occupies the cavity of the uterus, the body of this organ will be appreciably enlarged, and feeling as if occupied by a fœtus or fibroid tumour; the diagnosis being difficult until the os and cervix have been dilated, so that the growth can be reached with the finger.

The treatment consists in making a sufficient incision into the mucous cyst, with the assistance of the speculum; or in having recourse to an incision with the application of caustic to the walls; or in snipping or twisting off the growth if it be at all pedunculated. These cases ought never to be allowed to end fatally, or even to injure the general health; because in any instances of uterine disease where there is constant leucorrhœa, with occasional attacks of hæmorrhage, and a small healthy os uteri, the latter should be dilated with sponge or sea tangle tents (F. 426). After this stretching has been fairly accomplished, the removal of a dead ovum, or of a mass of hydatids, or of a pediculated fibroid or cystic tumour becomes comparatively easy.

The *serous* cysts may be developed in the subperitoneal areolar tissue, or very rarely in the muscular substance of the uterus. They are probably of more frequent occurrence than the mucous bodies; but their presence is ascertained with greater difficulty during life, inasmuch as they grow from the external or abdominal surface of the uterus, while they give rise to no symptoms of any moment unless they happen to press upon the rectum or bladder. It is very probable that not a few of the cases of floating abdominal tumours, which are every now and then met with, consist of these cysts with a long pedicle; while it is also not unlikely that some of the instances of ovarian tumour, that have been recorded as cured by spontaneous rupture into the peritoneum, have really been examples of uterine cysts. The largest growth of this kind with which I am acquainted, occurred in a patient long under my care for severe uterine hæmorrhage, due to a fibroid tumour seated in the posterior wall of the uterus. In this case, the post-mortem examination revealed the presence of an oval cyst, formed under the peritoneum which was stretched upwards from the fundus uteri; and as the growth was supported upon the expanded wings of the iliac bones, the uterus had been almost kept out of the true pelvis by it. The sac measured nine inches in breadth, and contained about a pint and a half of urinous-looking fluid.*

When these serous cysts are detected during life, and when they give rise to troublesome irritation of the rectum or bladder, they should be cautiously punctured either with a bistoury or a trocar and cannula.

IX. DISPLACEMENTS OF THE UTERUS.

The displacements to which the uterus is liable have excited the attention of practitioners of medicine since the days of Hippocrates. It is only in the present century, however, that the different flexions and versions to which the non-pregnant womb is subject have been determined and distinguished from each other; while now in the second half of this century, we are employed in discussing the pathological significance of these displacements. The history of these questions is just a repetition of that which has happened over and over again. First, the occasional occurrence of some morbid state of the body is described, and after a considerable interval generally recognised. In the second term, the gravity of this condition is over-estimated, and its treatment often conducted with unnecessary severity. During the third period, the importance of the disorder is unduly depreciated; while the few practitioners who think such excessive depreciation an error, and who attempt to remedy the malady, are often ungenerously censured. And then in the fourth stage, "spirited discussions" (as many exhibitions of bad taste and imperfect knowledge have been euphoniously called) gradually cease,; the disease being allowed to drop into its proper position in the practice of physic. This last epoch has yet to be reached by some of the affections now to be described. To say that prolapsus and procidentia, flexions and versions, can now and then exist without giving rise to any symptoms of moment, is undoubtedly true; but it would be very incorrect, in my opinion, to argue that these conditions of the womb are therefore unimportant, or that they are not often the source of daily annoyance and discomfort, or that they do not readily lead to serious and painful complications.

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* For a detailed report of the patient's history, together with an excellent sketch of the uterus and the tumours, by Dr. Westmacott, see *Transactions of the Obstetrical Society of London*, vol. iii. p. 11.

1. PROLAPSUS AND PROCIDENTIA.

These terms have long been used in practice to designate a descent of the womb as it exists in two different grades. By "Prolapsus" [from *Prolabor* = to glide forward] is meant that condition in which the uterus falls below its natural level in the pelvic cavity; while by "Procidentia" [*Procido* = to fall down] is signified the protrusion of the uterus beyond the vulva. The causes of both conditions are the same: the symptoms vary but little save in degree.

Causes.—All women are liable to a falling of the womb; but it occurs most commonly after the age of thirty-five in such as lead a laborious life. Hence, cooks and laundresses and market labourers often suffer from it, and next to these perhaps are nurses. Women who have borne children are more frequently affected than those who are sterile; while lingering or instrumental labours especially predispose to it. Amongst other causes also must be enumerated all those conditions which tend to increase the weight of the uterus, such as congestion, hypertrophy, subinvolution after labour, tumours, &c.; violent bearing-down efforts, such as are made during parturition, in straining to pass hardened fæces, or in urging an evacuation through a stricture of the rectum; and forced respirations, particularly those used in coughing, the lifting of heavy weights, &c.

The immediate causes of the displacement may be said to be the pressure on the uterus by the superincumbent viscera, combined with a diminution in the tone of the uterine supports. Consequently, prolapsus or procidentia is prevalent among women who have a preternaturally shallow and capacious pelvis; in the sufferers from ascites and ovarian dropsy; in delicate flabby subjects, where the vaginal walls are relaxed, and the broad and round ligaments unbraced and elongated; as well as in cases where the perineum has been lacerated and the torn edges have not reunited. Very rarely we find procidentia during the early months of pregnancy; the uterus, however, as it subsequently rises out of the pelvic cavity assuming its normal position.

Symptoms.—The uterus can seldom fall to any extent without giving rise to much discomfort. Complaint is generally made of a sense of fulness or weight about the pelvis, of dragging or bearing-down pains, of a wearisome backache, and of a leucorrhœal discharge. Menstruation is seldom interfered with; there is no impediment to conception, since even in most cases of procidentia the uterus goes back by itself or is easily pushed up when the patient is in bed; and the general health is not directly affected. The extent to which the bladder and rectum suffer, in consequence of the pressure of the displaced womb, varies very much independently of the amount of displacement. In some few instances, there is a complete inability to pass water until the patient lies down and replaces the uterus with her fingers; while in other cases micturition may be annoyingly frequent. Constipation is often complained of, and if the woman be careless a large accumulation of fæces may take place in the rectum.

By a vaginal examination, in cases of prolapsus, the uterus is found depressed from its normal site, being often so low that it rests upon the perineum. The detection of the os uteri, at the inferior part of a cervix of the natural length, prevents any error in diagnosis.—In procidentia uteri, a round or pear-shaped tumour, of variable size, is seen projecting beyond the vulva; the mouth of the uterus, often somewhat dilated and covered with thick mucus, being visible at the centre of the lowest part of the tumour. It is always advisable to introduce the sound so as to learn whether the depth of the uterine cavity is increased beyond its normal extent of two inches and a half; as well as to make sure that the opening is not a mere cleft in a polypoid growth. The labia uteri frequently present excoriations, or even rather deep ulcers, produced by friction with the clothing and the irritation of the discharges. The epithelium of the vaginal mucous membrane is also dry and harsh and cracked; while sometimes there are one or more ulcers, looking as if portions of the mucous lining had been punched out.

Treatment.—The general principles may be summed up in a few directions:—Afford artificial support to the superincumbent abdominal viscera; give tone to the round and broad ligaments of the uterus, to the relaxed vaginal walls, and to the perineum; and remove any complications which can favour the falling, such as uterine congestion or hypertrophy, cough, constipation, &c.

Before speaking of the best mode of carrying out these indications, a remark or two must be made as to the way in which a procident womb is to be replaced. With the great majority of cases there is no difficulty in effecting reposition. It is merely necessary to put the patient on her left side, with the legs well flexed; and then, having thoroughly oiled all the parts, to push up the uterus so as to allow this organ in its ascent to draw in the vagina. Supposing this plan to fail, it will be well to repeat the attempt while the woman rests upon her hands and knees, with her head much lower than her pelvis; in which position the downward pressure of the intestines must be removed. And still success not following, the procident uterus should be firmly encircled with strips of adhesive plaster, re-applying them every forty-eight hours; while the patient is to be kept quiet in bed for a few days, until the circumference of the tumour is sufficiently reduced. Immediately after the removal of the strapping, the uterus will almost certainly be replaced with ease. Dr. M'Clintock has recorded a case where, the procidentia having existed continuously for four years, he was unable to effect reposition until he had thus compressed the uterus and vagina by four consecutive strappings. In a remarkable instance, where this plan was not tried, and where the uterus was passing into a state of sphacelation although it had only been down three or four days, Mr. T. F. Edwards applied a whipcord ligature around the neck of the tumour. On the following day, a fresh ligature was put on; while the parts below it—consisting of the whole uterus—were excised. Seven days subsequently, the ligature came away; and in another fortnight the patient (who was 74 years of age) was walking about the streets of Denbigh to the astonishment of her surgeon and friends. The first symptoms of displacement had been observed twenty years previously, and there had often been some trouble in replacing the womb. Three months after the operation she appeared in good health.*

Returning to the subject of general treatment, attention must be directed to the importance of affording support to the abdominal viscera, a point which is too often neglected. Now support may be given in many ways. Where the patient is poor, she can generally be directed how to manufacture a belt of common jean, making it to lace behind; instructions being given that it is to be so constructed as to produce pressure from below upwards, while it ought to be comparatively easy above. A couple of bands, covered with wash-leather, are fastened behind, so that they may be brought under the perineum and then buttoned to the jean in front. These bands prevent the belt from riding upwards; while a pad covered with oil silk should be fitted on them, if necessary, to give support to the perineum. A much more perfect instrument is known as Hull's "Utero-abdominal Supporter," which forms an excellent abdomino-perineal bandage. Mr. Bigg has also contrived a very useful kind of abdominal plate, which is fixed with steel bands something like a double truss.

To give tone to the uterine ligaments and vagina, a nourishing diet with strengthening medicine ought to be prescribed. Every practitioner has a preference for some particular kind of tonic, and my predilection is in favour of a combination of nitric or phosphoric acid, nux vomica, and bark (F. 376). Of the various ferruginous preparations none are superior to the common tincture of perchloride of iron (F. 380, 392). Locally, recourse is to be had to astringent vaginal injections (F. 425); or to astringent pessaries (F. 423), which have answered admirably in my hands. In mild cases, tannin pessaries will almost alone effect a cure; but care must be taken that they do not set up too much irritation, and that their remnants are not allowed to accumulate in the vagina. Cold salt-water hip baths are also to be recommended. Where the mucous membrane is ulcerated, the application of nitrate of silver proves very serviceable.

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* *British Medical Journal*, p. 147. London, 6th February, 1864.

Three special methods of giving relief in these cases yet remain to be considered. And, first, with regard to mechanical pessaries, I would say that they have only seemed to me to be required in very rare instances. They are indeed clumsy inventions, mostly of use for concealing the practitioner's want of skill. But some poor women do not ask to be cured: they are unable to give the necessary attention, and all they desire is that they may still work as laundresses, cooks, market gardeners, &c., without a day's cessation. Under these circumstances the womb may be kept up by a well-adapted pessary. Many various kinds of instruments are sold; the best being Hodge's lever oblong ring or horse-shoe pessary, the oval vulcanized india-rubber pessary, the common elastic air pessary, and that known as Zwanke's pessary. This latter support is made of two oval plates of tin, united at one extremity by a hinge. On each side of the hinge, upon the lower surface of the plates, there is a metallic stem. These stems on being widely separated from each other, carry the oval plates face to face, thus allowing the instrument to be closed and easily introduced. Then by bringing the stems in contact, the plates are separated, so as to form an expanded surface like a pair of wings; this position being maintained by a screw which holds the stems together. Mr. Coxeter has somewhat modified this instrument for me, by substituting strong wires interlaced, for the oval plates; so that while the pessary is worn the patient may still use astringent injections, and thus hope for an ultimate cure.—Whatever pessary, however, is employed, the patient should be impressed with the importance of frequently removing it. The most offensive task I ever had was to extract an impacted boxwood pessary, which had been worn continuously since its first introduction two years previously. It was impossible to get it away without breaking it to pieces, and the stink from the matters which had accumulated in its interior was exceedingly disgusting. Moreover, several weeks elapsed before the ulcerations which the pressure of this globe had produced upon the vaginal mucous membrane were healed; and even then it was found that the procidentia remained uncured.

The second method aims at a radical cure, and consists in subjecting the patient to a somewhat severe surgical operation. The plan, originally known as Marshall Hall's, is to dissect off one or more longitudinal strips of the vaginal mucous membrane, and then to bring the edges of the wound together with sutures; so that after the surfaces have healed, the calibre of the canal will be found diminished in proportion to the extent of tissue removed. The strips ought to be somewhat wedge-shaped, the apices being towards the meatus urinarius; while by some surgeons it is thought better to remove a slip from each side of the vagina, rather than to take a very broad one from only the anterior or posterior surface. In the very few instances in which I have resorted to this procedure, the result has been successful; but it must be remembered that it is an operation not free from danger, and that the after-treatment is somewhat tedious.—Drs. Marion Sims and Emmet have improved upon this procedure by denuding a V-shaped portion of the tissue, with a transverse line of scarification to unite the two arms; the raw surfaces being brought into contact by silver wire sutures. This operation (elytrorrhaphy) has to be followed by perfect rest in the horizontal posture, with the repeated use of the catheter; while opium is given to relieve pain, as well as to procure constipation. The sutures through the angle of the V, next the urethral orifice, are removed at the end of nine or ten days; the upper ones being withdrawn about four days later.

A third proceeding, which has been extensively practised, and which I formerly resorted to more frequently than I do now, consists in partly closing the vulval opening; so that if the uterus afterwards descends it falls upon an elongated perineum, instead of escaping externally. The mucous membrane from part of the sides and posterior wall of the lower part of the vagina is cleanly dissected off, an extensive horseshoe-shaped raw surface being formed. Quill or clamp sutures are then employed to keep the opposite surfaces in close contact, and the edges of the wound are brought together with a few superficial sutures; the former being removed about the sixth or seventh day, while the latter are allowed to remain for a couple of days longer. This operation is principally adapted for those cases where the perineum is more or less deficient, owing to some rent having occurred at the time of labour; but where there is a healthy perineum it has seemed to me very often to fail. At all events, I have not succeeded to anything like the extent I had anticipated; and cases have come under my care of bad procidentia, although the perineum had been thus lengthened some months previously by surgeons of great experience. And this is not surprising. For it must be remembered after all, that the perineum has but little to do in preventing uterine depression; inasmuch as it is sometimes seen completely ruptured without any procidentia occurring, while it may be perfectly natural in some of the worst forms of descent. I have even observed a firm and large hymen coexistent with procidentia, as in the following case:—On the 3rd June, 1864, C. P., aged 41, single, with the catamenia regular, and following the occupation of a nurse, consulted me for a falling of the womb, from which she had suffered for three years. To my surprise I found a small cervix uteri completely protruded, there being also a tough and extensive hymen. The cervix, which appeared constricted, was gently pushed upwards into the vagina; the opening in the hymeneal membrane being then felt so contracted that it only admitted the finger with pain. A complete cure was effected by using the tannin pessaries, while a slight abdominal belt was worn.

In conclusion, it is necessary to warn the practitioner against placing much reliance upon those reports of cases of procidentia of the uterus which only show that the patient leaves the hospital "cured." For this term can never fairly be applied, unless she remains well for several weeks after resuming her customary occupation. To assert that a woman is cured, because her womb does not descend when she has just undergone some operation and has had a month's rest in bed is as great an abuse of language, as to say that a sufferer from mammary cancer is cured because her breast has been amputated and the wound has healed.

2. RETROFLEXION AND ANTEFLEXION.

The condition known as retroflexion [from *Retro* = backwards + *flecto* = to bend] consists of a bending back of the uterus at the part where the neck joins the body; so that the fundus is found between the cervix and rectum, the os uteri being in its normal position. The uterus, indeed, becomes shaped like a common retort. In anteflexion [*Ante* = forwards + *flecto*] we find the fundus pressing upon the bladder. Considering that in the natural condition of the nulliparous womb this organ is slightly inclined forwards, it might be expected that in after-life cases of an exaggerated degree of anteflexion would be much more commonly met with than examples of retroflexion. And according to some authorities this is the fact to a marked extent; although in my own practice it has been the very reverse. Without explaining the circumstance it is certain, that for every case of anteflexion about which I am consulted, I see five or six of retroflexion: and this has been my experience for several years. Displacement of either kind is rare in virgins.

Causes.—The displacements under consideration may result from the fundus being top-heavy, owing to the presence of a fibroid tumour in either the anterior or posterior wall of the uterus, or of a polypoid growth in the uterine cavity. Prolonged congestion also probably acts in the same way. Any weight upon the fundus—whether this be due to an abdominal tumour, or a fæcal accumulation, or tight lacing forcing the viscera downwards will produce displacement. Relaxation of the proper tissue of the uterus is not an uncommon cause of retroflexion; and therefore we meet with this displacement in cases of too frequent child-bearing, in fatty degeneration of the uterine walls, in delicate women suffering from menorrhagia, and in women who become exhausted through excessive sexual intercourse. The false membranes formed in pelvic peritonitis are now and then the cause of these deviations owing to their shrinking like cicatrices elsewhere.

Irregular contraction of the uterus, especially after abortion, often produces backward displacement; while the latter is certainly increased, even if it be not sometimes originated, by constipation and the straining exerted to pass hardened fæces.

Symptoms.—Retroflexion may undoubtedly exist without giving rise to symptoms of the least importance. This only happens, I believe, when the displacement is slight and the uterine structures are flabby, or when the pelvic cavity is more than ordinarily capacious. But where the angle of flexion is acute, where the circulation through the uterus is much interfered with, and where the fundus is immovably pressed upon the rectum—encroaching upon its cavity like a firm tumour, I have always found the patient complains of considerable annoyance if not of actual suffering; annoyance, be it observed, which continues day after day, and is only varied periodically by dysmenorrhœa.

In a typical case of retroflexion the practitioner's attention is first directed by the patient to a dull, wearing, and constant backache, which is most marked about the sacral region. He will be told that the pain shoots down the thighs, and that the groins are tender. Complaint is also made of a feeling of fulness about the rectum, so that there is an unusually frequent desire to go to stool although nothing comes away. Moreover, the passing of a motion which is at all constipated aggravates the aching in the back, and perhaps produces pains which shoot through the pelvis. Sexual intercourse is attended with suffering, and is not followed by pregnancy; while just before and after the monthly periods there is so much tenderness that connexion cannot be tolerated. The catamenia always come on with pain and difficulty; but about the end of the second day the flow of blood seems to give some relief. This is a more or less abundant catarrhal discharge. The general health is bad; there are frequent attacks of nausea; the appetite is small; the spirits are much depressed; and a train of symptoms is present which the sufferer has been assured is only due to hysteria. Very violent hysterical attacks may in fact be induced in a woman or girl previously entirely free from hysteria by the occurrence of acute retroflexion. On making an examination, the os and cervix uteri are found in their proper situation in the median line; but encroaching upon the rectum is a round body, exquisitely sensitive to the touch, and which consists of the congested fundus. On touching this part, or on attempting to elevate it, the patient will exclaim that it is the seat of her suffering. Owing to this great tenderness there will be but little difficulty in recognising the nature of the case; but in order to be absolutely certain that there is no tumour, the substance must be gently raised with the finger, while the sound is cautiously passed into the uterine cavity. The disappearance of the tumour during the time that the uterus is kept in its normal position, makes the diagnosis certain; but if any confirmation be still needed, it may be found in the circumstance that after the withdrawal of the sound the fundus will be gradually felt falling back again.

In the comparatively few cases of anteflexion which I have seen, the general symptoms and the local suffering have seldom exhibited much severity. In fact, such cases would hardly fall under observation, were it not that the pressure of the fundus very commonly produces great irritability of the bladder; so that while the patient is in the erect position the desire to micturate is almost as frequent as in cases of vesical disease. Moreover, although it is not uncommon to find considerable engorgement and tenderness of one or both ovaries in retroflexion, such complications are rare in anteflexion. Sterility is the consequence of both displacements when they are well marked; since at the angle of flexion the canal of the uterus is completely obstructed. Where the uterus is bent and its fundus fixed to the right or left side, the cervix remaining in the median line (lateroflexion), this deviation from the natural position will generally be found to have been caused by some congenital maldevelopment, or to have subsequently originated in an attack of inflammation of some of the pelvic structures—especially of the connective tissue.

Treatment.—Supposing the deviation to be recent, there is a hope that the uterus when replaced by the sound will retain its natural position. In some few cases of retroflexion and anteflexion this happens; and then the patient by remaining quiet in bed, for some twenty-four hours, is enabled to leave it quite well.

But in the greater number of instances, the womb falls back almost immediately after it has been replaced. If there be much congestion of the labia and cervix, good results will follow on relieving this hyperæmia by applying leeches to the lips of the womb or by puncturing them. Then, when it is certain that there is no endometritis, a cure may sometimes be effected by the introduction of a stem pessary; by which instrument the circulation through the uterine tissues is allowed to go on naturally, and therefore the fundal congestion gets removed. The intra-uterine stem which I have found most useful is one which has been made by Mr. Coxeter at my suggestion. It is two and a quarter inches in length, and is fashioned somewhat like a flattened silver female catheter; having a slight curve corresponding to the natural bend of the uterus, and terminating at its lowest part in a thin concave plate on which the labia uteri rest. If this instrument produce the least pain, if the congestion of the uterus do not gradually disappear, or if there be any ovarian tenderness, medicated pessaries containing belladonna and the iodide of lead or the mercurial ointment (F. 423) are also employed at the same time. The patient is kept in bed for the first few days, and then gradually allowed to get about. If there be any approach to menorrhagia at the periods, the stem ought to be withdrawn at the time of the flow, and re-introduced after the discharge has ceased. But in many cases I have allowed the instrument to be retained during the whole time, merely keeping the patient on the sofa until the period has ended. The whole duration of the treatment (the time during which the stem has to be worn) varies very much in different cases: a cure may be effected perhaps in two or three weeks, or not for as many months. Whatever the length of time may be, the patient is to be watched during the whole term.

There are cases, however, where this plan is inapplicable. With such, when the mucous membrane of the uterine canal is healthy, we may resort to the measure suggested by Dr. Moir of Edinburgh. This consists in dilating the cavity of the uterus with the sponge or sea tangle tents (F. 426); beginning with a small size, and persevering until the finger can readily enter and explore the cavity. Having satisfied ourselves that there is no foreign body present, the uterus is allowed to contract upon a metallic stem such as has just been described. The stem should be changed every forty-eight hours, beginning with one of considerable size, and ending with one rather larger than the uterine sound. The stem last used, moreover, had better be worn for some few weeks. Dr. Moir recommends wire pessaries covered with gutta percha, but I have not employed them.

In a third class of cases, where the uterine congestion and tenderness have been very great, or where there have been more or less prominent symptoms of endometritis, I have adopted a practice the value of which I first learnt from Mr. Baker Brown. This gentleman, believing that the muscular tissue is not passive in retroflexion, and that there is probably active contraction at the point of flexion, has incised the os and cervix with the hysterotome; dividing the parts freely up to, but not through, that contracted part of the cervical canal usually known as the internal os. I am not quite certain whether Mr. Brown divides the tissues at the angle of flexion, but I have always done so; although the incisions at this point must be made very cautiously, inasmuch as the tissues are often thinner there than in healthy uteri. With the precautions already recommended in using the hysterotome, I believe that this operation is almost free from danger, and that if adopted in suitable cases it will effect a cure.

One word of warning must be added as to those rare cases where the uterus is not only displaced, but in which the fundus is bound down by adhesions to its unnatural situation. To rupture these would probably be to excite severe, and perhaps fatal, peritonitis. Should such adhesions be present they may be diagnosed by the practitioner finding it impossible to elevate the fundus with the finger; while if he attempt to replace the womb with the sound the tearing pain produced will be unbearable. In such cases, we shall have to be contented with giving relief by the frequent use of the iodide of lead and belladonna pessaries; two or three leeches must be occasionally applied to the uterine lips when there is evidence of congestion ; and the bowels ought to be kept regular by pepsine, the mineral acids, and very simple aperients, so as to prevent any lodgment of fæcal matter in the rectum above the projecting fundus.

3. RETROVERSION AND ANTEVERSION.

These displacements are very seldom met with in the unimpregnated state. In retroversion [from *Retro* = backwards + *verto* = to turn] the uterus lies almost transversely in the pelvic cavity ; the fundus being towards the hollow of the sacrum, while the os is drawn under the arch of the pubis. The opposite condition, anteversion [*Ante* = forwards + *verto*], is characterized by the fundus lying towards or against the bladder, while the os is found directed to the cavity of the sacrum.

The chief *symptoms* are backache and bearing-down pains. There is usually a leucorrhœal discharge, but this is due more to the cause of the malposition than to the displacement itself. Menstruation is not interfered with, neither is impregnation absolutely prevented. In retroversion the os uteri is seldom pushed forward with such firmness as to press on the urethra, and so give rise to retention of urine ; although such an occurrence is very commonly the result of this displacement when the uterus in enlarged by the existence of pregnancy. Nevertheless, it may happen that micturition will be impeded ; and therefore if any tumour be felt at the lower part of the abdomen, or if the patient complain of a constant desire to pass water, or especially if the urine should dribble away, the catheter ought to be passed without loss of time.

Supposing the fundus to be inclined to one side of the body while the os uteri looks towards the opposite side (lateroversion), there will usually be obtained a history of previous pelvic peritonitis, unless there has been some congenital arrest of development causing a neighbouring viscus to drag aside the uterus. Under either of these circumstances the malposition is most times incurable. The occurrence of pregnancy in these cases though not impossible, is surely very improbable.

In the cases of retroversion and anteversion of the non-pregnant uterus which I have seen, the general condition has been one of debility ; the muscles especially being deficient in tone, and the vaginal walls much relaxed. The *treatment* has therefore consisted in allowing a nourishing diet ; in administering such tonics as quinine and steel and nux vomica (F. 380), or the mineral acids with strychnia and some bitter infusion (F. 378) ; while locally astringents have been employed, particularly injections of alum and sulphate of zinc (F. 425), or tannin pessaries (F. 423). Cold sea water baths have proved especially useful. The occasional replacement of the uterus with the sound has also materially assisted the cure.

4. HERNIA OF THE UTERUS.

Hernia of the uterus or of its appendages is an accident concerning which the records are very scanty. Of the reported cases, it is remarkable that the greater number are examples of displacement of the gravid uterus. Hernia differs from eventration of the womb in this respect; that whereas in the former case the womb passes through the inguinal or crural opening, in the latter it is forced through some artificial aperture—as between the recti muscles, &c., or through a wound in the abdominal parietes.

Hernia of the unimpregnated uterus can happen at the inguinal ring, or at the crural arch, or through the obturator foramen ; while it may probably arise from too great relaxation of the ligaments of the uterus, or from displacement of the uterus by tumours within the pelvis, or from the contraction of bands of false membrane, &c. The diagnosis of this condition from ordinary intestinal herniæ will hardly be very difficult, if a vaginal examination be instituted ; though without this a mistake is not unlikely to be made, since the symptoms may at times resemble those due to strangulation of the intestines. An examination of the recorded cases of uterine hernia shows that pregnancy can occur, and full development of the fœtus take place, while the uterus remains in its abnormal position. The treatment of such an accident must depend very much on the length of time which has elapsed since its occurrence, and on the nature of the symptoms. When recent, it would seem not unlikely that cautious attempts at reduction might be attended with success ; although supposing the manipulation to be fruitless, an operation would scarcely be justifiable unless there happened to be severe suffering and constitutional disturbance.

The protrusion of the gravid uterus at the umbilicus has been met with more frequently than any other variety. Dr. Evory Kennedy says that he met with a remarkable example, in a woman who had borne a number of children. When in labour of her second child, hernia took place at the umbilicus, which gradually increased in extent with each child she carried ; until at length the impregnated womb made its way completely out of the abdomen, and became suspended over the pubes, so that at the end of the ninth month it hung down as low as the knees.

I believe that no instance of hernia of the gravid uterus at the inguinal ring is known to have occurred in our own country ; and probably not more than five or six examples are to be found recorded in medical literature.

5. INVERSION OF THE UTERUS.

Not a few practitioners pass through a long and busy life without ever meeting with a case of uterine inversion. The uterus, in this accident, is literally turned inside out. The fundus descends through the os uteri; so that the mucous lining of the cavity of the womb becomes the external covering of the tumour, which projects into the vagina and generally through the vulva.

The uterus may be inverted immediately after labour; either from delivery occurring unexpectedly while the patient is in the erect posture, or from irregular contractions of the uterine fibres, or from the practitioner making violent traction on the funis to remove the placenta.*

The fundus of the uterus will now and then become much depressed directly after parturition, although complete inversion does not follow for many hours or even for a few days until some irregular contractions have forced the fundus and body quite externally. These cases are sometimes spoken of as examples of *spontaneous* inversion, the accident occurring independently of any interference on the part of the practitioner.

Cases of inversion have also been observed quite independently of parturition. Thus, a polypus attached by a very short pedicle to the fundus uteri having been expelled into the vagina, the womb has become inverted owing to the continuance of the forcing pains. An excellent example of this occurrence can be seen in the Hunterian museum—Preparation 2654. Or again, straining efforts like those of labour have been set up by a fibroid tumour, and the uterus has been inverted so that the growth could be seen projecting from the uterine wall.

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* The examples of inversion which have been under my own observation are the following:—The *first* case happened on the 2nd July, 1860, when I received a note asking for my immediate attendance, as "a large tumour had been spontaneously expelled from the womb directly after the birth of the child." The gentleman who had effected delivery thought the tumour might be ligatured, or at once cut off, with advantage. On examination the uterus was found completely inverted, with placenta attached. The patient was very faint, but on peeling off the after-birth only slight difficulty was experienced in effecting reposition. She recovered favourably.

The *second* instance occurred on the 2nd August, 1860. The patient, a primipara, was attended by an experienced student from King's College Hospital. On the birth of the child there set in considerable hæmorrhage; and while the accoucheur was attempting to check the flooding by removing the placenta, the uterus became complety inverted. I took away the placenta, reduced the inversion, and the patient did well.

The *third* example was met with on the 26th February, 1866. Mrs. ——, nineteen years of age, was delivered of her first child at the end of the eighth month of gestation. Directly after the removal of the placenta Dr. O'Flaherty discovered that the uterus had become inverted. On my arrival about an hour afterwards, I found the patient much prostrated. There was complete inversion, the uterus being between the patient's thighs. The placenta had evidently been attached to the fundus. Owing to the flabby nature of the organ (it seemed almost as if there were advanced fatty degeneration) great care had to be taken in effecting reposition, which was however accomplished. But within an hour afterwards the exhaustion rapidly increased, and the patient sank in spite of the liberal administration of stimulants.

The symptoms which immediately result from inversion are those of severe nervous shock. There are also bearing-down pains, nausea and vomiting, and cold sweats; together with a rapid feeble pulse, and perhaps hæmorrhage. Where the placenta has come away prior to the accident, the latter may escape detection; the symptoms probably being attributed to the hæmorrhage. Under these circumstances, death has occurred from exhaustion without a suspicion as to its cause; until the nature of the case has been revealed at the autopsy. Or the patient has gone on for months, or perhaps for years, suffering from very bad health, anæmia, repeated attacks of hæmorrhage, nausea, &c., without the cause being surmised until a proper vaginal examination has been made. And even then, at least some nine or ten cases are known where the inverted womb has been mistaken for a polypus; the error not having been discovered until after the organ has been excised, or a ligature placed around it. No false diagnosis can be made, however, if the relations of the tumour to the os uteri be observed. For on passing the finger, or the sound, upwards along the tumour, a cul-de-sac will be found all round its neck; so that the instrument will not penetrate between the tumour and the os uteri for more than about half an inch. If the inverted womb be protruded beyond the vulva, the rough and bleeding surface of the body will proclaim its nature. Moreover, if further evidence be needed, the orifices of the Fallopian tubes may be sought for and a probe passed for some little distance into each canal.

Supposing that the uterus is inverted with the placenta attached, the latter organ had better be peeled off before attempting reposition. It has been thought that by adopting this practice, the risk of hæmorrhage would be increased; but independently of the great advantage derived from lessening the bulk of the womb, the danger is more imaginary than real. Then the uterus should be grasped as firmly as possible, and steady long-continued pressure made in an upward direction, so as to reduce that part first which has last descended. The inhalation of chloroform or some other anæsthetic can generally be allowed with advantage; for independently of the importance of saving the patient unnecessary pain, these agents will help to relax the os uteri.

For chronic cases the same plan of treatment is to be resorted to. If the inversion be of some years' duration, it will probably be necessary to repeat the attempts at replacement day by day, for some seven or eight occasions; keeping up pressure in the intervals by the introduction into the vagina of a well-adapted air-pessary.

This practice failing, Dr. Robert Barnes' suggestion of making an incision on either side of the os uteri, and then reapplying pressure, ought to be tried. In a case of inversion of six months' standing, which resisted elastic pressure steadily maintained for five days, Dr. Barnes made three longitudinal incisions into the os uteri, so as to relax the circular fibres; the taxis when then applied succeeding quickly in effecting reduction. Assuming that, after as many fair attempts as seem justifiable, the inversion is found irreducible, is further treatment to be abandoned? As a general principle, the answer to this question must be in the negative. For there is sufficient evidence to show, that the danger of the patient sinking from the constant irritation and repeated hæmorrhages produced by an inverted womb is really greater, than that which follows the removal of the organ by the ligature or écraseur. The experience which I have had with the latter instrument in other operations upon the uterus, leads me to recommend its employment in this; for if the chain be worked slowly and cautiously there is no fear of hæmorrhage, while the risk of inflammation is certainly less than with the ligature.

X. DISEASES OF THE OVARIES.

The ovaries (the analogues of the male testes) are oval-shaped bodies, placed one on each side of the uterus, in the broad ligament, behind the Fallopian tube and the round ligament. Each gland is some eighteen lines in length, twelve in breadth, and about one hundred grains in weight; each is in a great measure invested by peritoneum; while each is connected with the side of the uterus by the ligament of the ovary, and with the fimbriated extremity of the Fallopian tube (the oviduct) by a slight ligamentous cord. Along the anterior margin of the ovary, where there is no peritoneum, the proper fibrous tunic of the ovary (the tunica albuginea) is seen; enclosed in which is the vascular stroma, having numerous transparent vesicles (Graafian follicles) imbedded in its structure. Every vesicle is an ovisac, containing an extremely minute ovule or ovum, surrounded by albuminous fluid. As each menstrual period approaches, a Graafian vesicle reaches the surface of the ovary; and then rupturing, the contents of the vesicle pass into the canal of the oviduct, the orifice of which, for the time, has become attached over that part of the ovary containing the ripe vesicle. The ovisac having discharged its contents, a little extravasation of blood and serum takes place into it; and some firm yellow material having been exuded from the walls, a corpus luteum is formed. If pregnancy happen from the union of the male sperm cell with the female germ cell (or ovum), then the corpus luteum is much larger and more vascular and presents more yellow matter than where the ovule perishes without fecundation. In the one case there is a true, in the other a false corpus luteum.

The ovaries may be absent; or they are sometimes found undeveloped, retaining their fœtal condition throughout the life of the bearer; or they can become prematurely atrophied—before the usual time for the change of life. Their other morbid states will now be considered under the heads of inflammation, tumour, and displacement.

1. ACUTE AND CHRONIC OVARITIS.

Inflammation of the ovary (formerly known as Oophoritis) in the non-puerperal state, occurs under two forms,—the acute, and the subacute or chronic. The first variety is as rare as the second is common. It is comparatively seldom that both glands are simultaneously affected in either form; while the left ovary is more frequently attacked than the right. In sixty-eight cases of acute and chronic ovaritis, the histories of which have been collected by Dr. Tilt, the inflammation was on the left side in 34, on the right in 21, and on both sides in 13. Moreover, it is happily an exceptional circumstance to find the morbid action running on to suppuration.

Acute ovaritis may be due to violence, or to the application of strong caustics to the cervix, or to the suppression of the menses from a sudden shock or cold, &c. Pelvic cellulitis and peritonitis now and then originate it, the inflammation spreading to and involving these glands. Ovaritis has also occurred during the progress of gonorrhœa; but whether due to this disease, or to its treatment by astringent injections, copaiba, &c., seems doubtful.

One of the prominent symptoms is pain, which is of a variable character. Sometimes it is persistent and intense; although more frequently it is not continuously severe but rather of a dull aching character, with a recurrence of sharp lancinating paroxysms. The lower part of the abdomen is tender; and especially so are the groin and the inner part of the thigh, on the side corresponding to the affected gland. If the morbid action continue unchecked, the tissues of the broad ligament (if not already inflamed) become involved in the mischief; and then the pain is greatly increased, while the bladder usually suffers. The calls to micturate are frequent: the urine becomes scanty, high-coloured, often loaded with urates, and scalding. When also that portion of the serous membrane covering the lower part of the descending colon and rectum gets affected, there will be symptoms of tenesmus; while the passage of scybala often causes intense suffering, especially if the hardened fæces press upon the inflamed ovary. There is usually considerable constitutional disturbance,—such as fever, rapid pulse, a thickly-coated tongue, distressing nausea and retching, flatulence, disgust for food, restlessness, &c. A vaginal exploration shows that the cervix uteri is free from swelling or undue heat, although it is often somewhat tender. But on moving the finger to the right or left side, according to the ovary affected, the practitioner will detect an exquisitely sensitive body; which body is found to be almost immovable, and at least about the size of a large walnut. Where the abdominal walls are thin, the gland may be more distinctly felt by making pressure with the left hand above the pubes, while the forefinger of the right hand is retained within the vagina.

Pus may form in the ovary without there being any well-marked symptoms to indicate its presence, excepting more or less severe and constant pain. This happened with a lady who was under my care several years ago, and who died in consequence of the effusion of the matter into the peritoneum. In the larger number of instances, however, the occurrence of suppuration has been indicated by rigors, a quick and feeble pulse, a glazed red tongue, excessive sickness, and a sense of weight and throbbing about the lower part of the abdomen. The tissues in the neighbourhood of the ovary and broad ligament get involved in the suppurative inflammation; so that the case becomes one of pelvic cellulitis. Should the abscess burst into the rectum, or into the vagina, a feeling of relief will usually be experienced immediately, and the patient may ultimately do well; though not unfrequently these cases are very troublesome, as the opening closes and the matter accumulates again and again. Where the pus is discharged into the peritoneum, inflammation will be set up which is almost certain to end fatally.

During the treatment of acute ovaritis complete rest in bed is needed. I have seldom had recourse to depletion, unless the attack has been connected with a sudden suppression of the menses. But in such cases, the application of four or six leeches to the lips of the uterus often gives marked relief. Hot hip baths, repeated night and morning for twenty or thirty minutes at a time, are always serviceable; their employment being followed by the introduction of a pessary of opium and belladonna (F. 423) into the vagina. When the bath produces faintness, half a tumblerful of white wine whey (F. 10) ought to be given at the time of depression. If it be thought desirable to administer mercury, this agent may be advantageously mixed with the pessary; but care should be taken not to produce salivation. As a rule, a mixture containing full doses of iodide of potassium with chlorate of potash will be found much more efficient than any of the mercurial preparations. Fomentations to the lower part of the abdomen, or hot linseed poultices applied over the vulva and hypogastric and inguinal regions, are serviceable. Where these measures fail to relieve the pain, opium should be given; sometimes one grain of the extract being needed every three or four hours. Supposing that suppuration has occurred, and that the abscess decidedly points in the vagina, it may be advisable to carefully let out the pus with a trocar or bistoury; but the practitioner had better not interfere unless he feels quite certain with regard to the diagnosis. I know of no means by which an ovarian abscess can be distinguished from a pelvic abscess; and therefore as regards treatment it is fortunate that such differentiation is unnecessary.

Chronic or *subacute ovaritis* is a very common affection during the period of sexual vigour. This will not appear remarkable if it be remembered how closely allied the process of ovulation is to inflammation. The monthly congestion of the ovary, terminating in a rupture of its coats, is just that kind of physiological process which would seem most likely to run on to disease upon very slight provocation. And not only does this periodical congestion predispose to attacks of ovaritis, but it often renders the affection very obstinate when once established; for while the inflammation interferes with the healthy performance of the menstrual functions, the morbid menstruation aggravates or perpetuates the inflammation. So also, whatever interferes with the due performance of the uterine and ovarian functions may induce subacute ovaritis. In this way it can be set up by cold, especially if this cause be called into play during menstruation. The injection of iced water into the rectum to check flooding, has been known to induce an attack of ovaritis. Again, this disorder is not infrequent in the newly-married, being produced by excessive sexual intercourse; while it is not an uncommon cause of suffering to prostitutes. The improper application of caustics to the uterus, or the rough use of the uterine sound can set up inflammation; just as the rash employment of the catheter may make false passages in the male urethra, or may induce orchitis. But as catheterism is not to be condemned because it is productive of mischief in unskilful hands, so the uterine sound can only be spoken of as "an abomination" by gentlemen who have not the dexterity to handle it with the care which all instruments require. Lastly, I believe that subacute ovaritis will at times occur spontaneously in women of a rheumatic diathesis; and also in such as have a syphilitic taint. It is very probable that ovarian syphilis may consist either of an inflammatory action diffused through the whole gland; or of hypertrophy from the production of gummata.

The chief symptoms of this form of inflammation are—a dull and continuous aching in the ovarian and sacral regions; tenderness about the upper part of one or both thighs; scanty and difficult menstruation; and pain on sexual intercourse. Irritability of the stomach is common; so that there are frequent attacks of nausea, of indigestion, and sometimes of sickness. There are paroxysms of hysteria; with soreness and irritability of the bladder. Evidence is given of more or less dysmenorrhœa and leucorrhœa; as well as of tumefaction and tenderness of one or both breasts. In exceptional cases there may be appearances leading to the suspicion of masturbation. Attacks of nymphomania, or even some chronic forms of insanity, occasionally have their origin in subacute ovaritis. If pressure be made over the groin on the affected side complaint will be made of pain, while now and then there is a slight apparent fulness; and if a vaginal examination be instituted, the inflamed gland will be felt swollen, and sensitive to the touch.

As to the selection of remedies it must be remembered, that the sufferers from subacute ovaritis are for the most part delicate women; and that no plan of treatment will be successful which does not tend to improve the general health. Hence it is always important to pay attention to all that pertains to hygiene. The patient should clothe warmly; and especially ought she to wear cotton drawers in the summer, and flannel ones during the winter months. Her diet should be nourishing, animal food being taken at least once a day; while malt liquors must decidedly be forbidden, and milk freely allowed. Gentle exercise had better be taken daily in the open air, walking generally causing less annoyance than the jolting of a carriage. Riding on horseback does harm, even if it can be borne. Warm hip baths, once or twice a week, are also useful; whereas cold bathing is generally injurious. Sexual intercourse will at least retard the cure. With regard to drugs I confess to having most faith in the chlorate of potash, which should be ordered in twenty grain doses three or four times a day. Where this fails, success often follows from the use of the iodide of potassium, which is generally best given in combination with some bitter infusion (F. 31). Where there is much pain, from five to ten minims of tincture of aconite should be added to each dose. Cod liver oil is especially serviceable, provided the stomach can digest it; and even if there be any difficulty in this respect, a daily dose of pepsine (F. 420) will often overcome it. And then, locally, no agents will prove so serviceable as the iodide of lead and belladonna pessaries (F. 423), one being introduced into the vagina every night. When the sacral pain continues in spite of the use of these pessaries, a belladonna plaster ought to be applied. It is only necessary to add that bleeding and purging and blistering have never appeared to me to be necessary. On the other hand, I have seen all the symptoms considerably aggravated by the administration of steel.

2. OVARIAN TUMOURS.

Three varieties of tumours are met with in the ovary, viz. the fibrous or solid, the cancerous, and the cystic. The first two kinds demand but little notice. For not only are they rarely met with, but the innocent growths seldom destroy life unless improperly interfered with; while the attempt to remove a malignant tumour by abdominal section will probably prove immediately fatal, and in any case can scarcely be expected to effect a thorough cure.

Cystic disease of the ovary—the common ovarian tumour—consists in the conversion of the gland, or of parts of it, into cysts. These cysts, in at least the majority of cases, have their origin in the Graafian vesicles. This seems proved by Rokitansky's demonstration of the presence of an ovule or ovum in an ovarian cyst. Dr. Woodham Webb has likewise examined a tumour, the multilocular character of which was produced by clusters of ovisacs of various sizes; while he found ova in all the small sacs. There is also every probability that Dr. C. G. Ritchie's suggestion is correct,—that in some cases ovarian cysts are actually due to the development of the ovum while still in its ovisac. From some cause the ovule has not been able to escape out of its sac, and it has undergone a series of transformations while retained. Such changes occur quite independently of impregnation. Looking at the structure of the ovary—seeing that it is a cyst-forming organ, the wonder is, not that cystic development now and then proceeds to an abnormal extent, but that it does so with such comparative infrequency.

There are three varieties of ovarian cysts,—the simple or unilocular; the compound, multilocular, or proliferous; and the dermoid cysts. The simple cysts are less frequently met with than the compound; they often attain a considerable size; and the fluid they contain generally resembles urine in appearance and density, while it is loaded with albumen. The multilocular tumour is the most common; the cysts vary in size, there frequently being one large one, with a number of smaller sacs congregated towards the pedicle; and the albuminous contents are thick or gelatinous, often dark-coloured from admixture with altered blood, and presenting large quantities of cholesterine which may be skimmed from the surface after the fluid has been evacuated. The dermoid cysts (or ovular growths, as I would call them) are peculiar, inasmuch as they are examples of an attempted development of the ovule or ovum, without fecundation; such growths containing skin, bone, hair, teeth, and sebaceous matter.

Ovarian tumours run their course much more rapidly than is generally supposed; and it seems to me probable that the greater number prove fatal within four years from the first recognition of the symptoms. For although the growth of the tumour is at the commencement slow, yet after it has attained sufficient size to prove of considerable inconvenience the rate of increase is as rapid as the development becomes marvellously great. Like all diseases of the sexual organs, the one under consideration is most common during the time that the functions of the ovaries are called into play. The greater number of cases occur between the ages of 30 and 40, and next between 20 and 30. The disease affects both married and single women,—perhaps the former more frequently than the latter; while the sufferers from it are often sterile, or at all events their pregnancies have been few.

With regard to the ovary most liable to be affected, it seems that if we look to the records of 500 cases of ovarian tumour, examined only during life, we shall find the disease said to be seated in the right gland in about 230 cases, in the left in some 190, and in both in 80. But if we take only those cases where the opinion has been verified by operation or post-mortem investigation, then the numbers become much more equal, though there is still a slight preponderance in favour of the right side. In about one case in twenty both glands are diseased, although the proportion is said to be much greater by some authorities.

The deaths registered as due to ovarian dropsy, in England, during the twenty years (1847-66) have averaged 225 annually. Throughout these years the mortality has not varied very considerably; the largest number of deaths for any one year being 277 (in 1859), while the smallest number has been 178 (in 1852). The proportional number of deaths from ovarian disease to the increased population has very considerably decreased during the last seven years. Whereas the mean annual deaths from ovarian disease in 1,000,000 living, from 1860-64 was 12·8, during the five years from 1865-69 they averaged only 10·6, and in the two following years 1870-71 only 10 and 9 respectively. This decrease may perhaps be due to the improved method of treatment by operative interference.

The *symptoms* produced by an ovarian tumour in its early stages are usually so slight, that the disease oft-times fails to attract any attention until the patient finds her abdomen rapidly enlarging; while even then, so little pain or annoyance does she experience, that the increase in size is often attributed to pregnancy, to flatulence, or to the growth of fat. It is only in exceptional instances that the tumour, while small enough to remain in the pelvic cavity, gives rise to irritation of the rectum or bladder, or to a sense of weight and oppression, or to pain and numbness extending down the thigh of the affected side; these symptoms being much more characteristic of ovaritis, and even of fibroid tumours of the uterus. Pain in the back—an annoying aching and weakness about the sacrum, is not unfrequently complained of; but women so constantly suffer from this that they hardly think of seeking advice for it. Moreover, in the greater number of cases menstruation continues regular; though in others the flow may be entirely suppressed, or it will appear irregularly, or it may be scanty or profuse.

When the tumour has attained such a size that it can no longer escape observation (which, strange as it may appear, will probably not be until it is as large as a child's head) then pain or tenderness begins to be complained of; the pain not being so unbearable, however, as is the sense of distension, although the suffering becomes severe when any peritoneal inflammation sets in. The menstrual function often gets disordered or suppressed, the patient loses flesh, and the tumour by its pressure interferes with the functions of the abdominal viscera. Constipation, indigestion, diminished secretion of urine, with frequent micturition, are amongst the chief complaints; while there is loss of appetite, restlessness at night, dyspnœa, diminution of strength, and in fact a sense of progressive general decay. On examining the abdomen, it is found much enlarged; and it may be difficult at first to decide whether this enlargement be due to a tumour, or to ascites, or to a combination of both. There is fluctuation, which varies in distinctness according to the number of cysts, their distension, and their size; while percussion elicits a dull sound over the whole tumour, except in those rare instances which will presently be referred to. In not a few cases the growth gives rise to ascites; but almost always, after a time, the lower parts of the abdomen, as well as the vulva with the thighs and legs become œdematous. Then the suffering rapidly increases, and the tumour greatly impedes the patient's movements; the nights are wretched, the sleep being imperfect and unrefreshing, while the attacks of dyspnœa prevent the woman from lying down; there is sometimes suppression of urine, followed by headache and stupor, convulsions and coma; or great prostration sets in, which soon ends in death.

The *diagnosis* of this disease is not always so easy as the physician might imagine from examining a well-marked case. In the early period, when the tumour is confined to the cavity of the pelvis, the patient seldom seeks advice; since she is either unaware of the existence of any morbid condition, or if she experience some slight inconvenience she deceives herself as to its cause. At this stage, however, if by chance an examination per vaginam be made, a tumour, varying from the size of a hen's egg to that of a large orange, will be discovered on one side or other of the uterus; while the vagina will be found elongated, and the os uteri drawn upwards and towards the affected side. At the same period, inspection of the abdomen will detect the existence of a certain amount of fulness on one side of the hypogastrium, or in one of the iliac regions. As the enlargement increases, the abdominal swelling becomes more symmetrical; so that when the tumour has reached the umbilicus, it is often somewhat difficult to decide whether one side of the abdomen presents any greater prominence than the other. Many practitioners imagine that an ovarian tumour always occupies the side on which the disease is situated, while the pregnant uterus is believed to have its centre as constantly in the median line; but neither of these propositions is absolutely correct.

A small ovarian tumour is more likely to be mistaken for a fibroid tumour growing from the side of the uterus, or for a distended urinary bladder, or for an abscess in the broad ligament, or for an extra-uterine gestation, than for the pregnant uterus. But the former may often be distinguished by the feeling of great elasticity, hardly amounting to fluctuation, communicated to the touch on making a vaginal examination; by the facility with which the sound can be passed into the uterine cavity, and the manner in which the uterus can be perceptibly moved away from the tumour and independently of it; by the persistence of the tumour after emptying the bladder with the catheter; by the non-existence of those constitutional symptoms which arise from inflammation ending in suppuration; and by the absence of those firm inequalities of surface which are produced by the different parts of the fœtus. The history of each case, and the duration of the symptoms, will also afford material help in forming the diagnosis: though I have seen recent cases of ovarian dropsy where there has existed suppression or irregularity of the catamenia, morning nausea and vomiting, indigestion, troublesome constipation, irritability of the bladder, a sense of movement in the abdomen, and swelling with tenderness of the breasts.

The chief diagnostic marks of an ovarian tumour which has attained a large size are the following:—The abdomen is found more or less completely occupied by the morbid growth; the enlargement being smooth and rounded without any prominences when the disease is of the unilocular variety, but often very uneven in the multilocular form. A practitioner has been known to confidently assert that the limbs of a child could be distinctly felt through the parietes, when there was only an ovarian tumour causing a considerable inequality of surface. In the erect posture, as well as in the supine, the tumour projects forwards, the flanks being undistended. In the multilocular, more commonly than in the unilocular tumour, the superficial veins coursing over the abdomen are seen to be enlarged; and it has been thought by some observers that the vessels on the side corresponding to the diseased ovary are generally the most distended. This observation, however, I have not been able to confirm. Pressure with the hand on the tumour communicates a sensation of great resistance; this resistance being most equable in the case of the unilocular disease, though it is almost the same in the multilocular tumour when there are large cells. Fluctuation is always very distinct where there is only one cyst; being of course more imperfect and obscure where there are several, and no single one of great size. Unless the morbid growth is very large and projects into the loins, or unless ascites coexists, fluctuation will not be detected in the flanks. The more viscid the contents of the cyst, the more obscure will be the fluctuation, as a general rule; and the same remark holds good when the cyst walls are very thick, or when the sac is very much distended. The pulsations of the aorta are sometimes communicated to the hand laid over the tumour. Percussion elicits a dull sound over the whole of the tumour, the only exceptions being when a coil of intestine passes between the tumour and abdominal wall, as it sometimes does just above the pubes; or when the cyst has been tapped, and has afterwards filled with air; or when a cyst has emptied itself into the intestine, and flatus has passed from the latter into the former. The dulness is uniform over the mass of the tumour, and its note is not affected by change in the posture of the patient; but there is resonance above the tumour, and in that lumbar region into which the intestines have been forced, which is always the one corresponding to the healthy gland. By auscultation a murmur can sometimes be heard in one or both iliac regions, owing to pressure exerted by the diseased mass upon the iliac arteries; otherwise only information of a negative kind is gained, there being an absence of borborygmi, and of course of the sounds produced by pregnancy. Cysts of moderate size, when free from adhesions, do not modify the respiratory movements; but when the growths are large they restrain the descent of the diaphragm, and especially do they do so when adherent. And then, in every case the signs of pregnancy should be looked for; not only to prevent any gross mistake in diagnosis, but so as to avoid the more excusable error of overlooking the coexistence of utero-gestation with ovarian dropsy.

The diseases which have chiefly been mistaken for ovarian tumours are the following:—Fibroid and fibro-cystic tumours of the uterus, especially when these have attained a great size. Instances of ascites, with a much enlarged spleen; or other examples of peritoneal dropsy, where the effusion of fluid is so copious that the intestines cannot float on its surface, and consequently there is dulness on percussion. Cases of extra-uterine pregnancy, which have gone on until the death of the fœtus without rupture of the cyst. Enlargements of the kidney, either from hydronephrosis or cancer. Hydatid tumours of the liver, and of the omentum. A tumefaction produced by a mass of intestines bound together by old peritoneal adhesions. Malignant and other growths from the peritoneum. Phantom tumours of the abdomen; the result probably of abnormal muscular action, combined with flatulence, and an excessive accumulation of fat in the abdominal parietes as well as in the omentum. And lastly, extensive collections of fæces, filling the rectum and even the greater portion of the colon, have led to an incorrect suspicion of ovarian disease.

Hitherto reference has been chiefly made to the diagnosis of simple ovarian disease from other affections causing abdominal enlargement. Every now and then, however, we meet with complicated cases,—that is to say, in combination with an ovarian tumour there is an enlarged spleen, or hydatid disease of the liver or omentum, or a renal tumour, or chronic inflammation of the peritoneum with a considerable effusion of ascitic fluid, &c. When, together with an ovarian tumour, there is enlargement of the uterus from disease, the diagnosis is difficult. In one very puzzling case which was under my care there were three separate affections; viz., ascites, a multilocular ovarian tumour the size of an adult head, and a uterus enlarged by two intramural fibroid tumours which had passed upwards out of the pelvis. The abdomen was immensely distended; but whether this distension was chiefly due to an ovarian tumour with one large cyst and a good deal of solid matter, or to ascites complicating some pelvic tumour, could not be determined until after tapping. An examination per vaginam showed the presence of some large uterine tumour; for there was a solid body evidently attached to the womb and appearing to cause retroversion, the os uteri being drawn high up under the pubic arch. In truth, however, the state of things could only be guessed at; the exact condition not being learnt until after death.

As regards the *treatment* of ovarian tumours nothing can be more absurd and reprehensible than the practice which some gentlemen even now adopt of administering hydragogue cathartics, diuretics, emetics, mercurials, iodine, iodide of potassium, liquor potassæ, bromide of potassium, muriate of lime, &c. Equally injurious are the local applications which the same practitioners employ, such as leeches, blisters, iodine ointment, friction with stimulating liniments, electricity, &c. It is only necessary to examine a single ovarian tumour, to see that such agents cannot by any possibility do good; and consequently as they are of a very powerful nature, they must be productive of harm. That such is really the case, I know too well; and I am led to speak thus plainly, from the painful examples which have come under my notice of health entirely ruined, and death hastened, by violent medical treatment.

There are only four ways in which the physician can hope to give effectual relief or to accomplish a cure in ovarian dropsy. The first plan is by abdominal tapping; the emptying of the cyst or cysts being followed by the application of firm and well-adapted pressure, with the administration of large doses of chlorate of potash for several months, or of this salt in combination with iodide of potassium. Usually the fluid re-accumulates, and repeated tappings are necessary, but occasionally a permanent cure is obtained.

The second plan is by paracentesis and the retention of an elastic catheter (or a drainage-tube) in the wound, to withdraw the fluid as it is resecreted. This proceeding, however, is by no means free from danger. It is seldom had recourse to unless the tumour be firmly fixed. Where it is moveable, however, it should be made to adhere to the abdominal wall before evacuating the contents of the cyst and introducing the tube. With this object the ingenious plan suggested by M. Trousseau had better be adopted, in preference to the use of caustic. This gentleman used to select the site most convenient for the ultimate introduction of a trocar, covering the skin in this region with a patch of diachylon plaster about the size of a crown piece. Through this he plunged from twenty to thirty steel needles (each about four inches long and tempered in the flame of a candle) which passed into the tumour, and were prevented from sinking through the skin by a head of glass or sealing-wax that rested upon the plaster. These needles caused scarcely any pain in their introduction, and they were allowed to remain in situ for five days. During this time some local tenderness usually developed itself, which was strictly limited to the area in which the needles had been introduced. At the expiration of the five days the needles were removed; and a small drop of the fluid of the cyst following the withdrawal of each, showed that adhesion had taken place. This fact might also be ascertained by palpation. After this proceeding M. Trousseau could always plunge a trocar into the cyst without fear of any accident. Tapping per vaginam may be practised in certain cases in which the cyst can be readily reached from this canal, the cannula being left for a time, or a self-retaining drainage tube being introduced.

The third plan consists in tapping the cyst, removing its fluid contents, and then injecting into it a solution of iodine. With regard to this I can only say, that in the cases in which I have tried it no permanent good has resulted; while in the hands of some physicians it has caused death. The only instances in which it is available are the unilocular tumours, or just those that may be often cured by tapping and pressure. Moreover, there is a fear of the disease being ascites and not a simple ovarian cyst; and then the injection would probably prove fatal. If, however, this plan be resorted to, the cyst must be emptied; and then a mixture, made of forty grains of iodine, sixty grains of iodide of potassium, and two ounces of water, is to be injected and left in the cyst, care being taken that none of it escape into the peritoneal cavity. Sometimes a cure is effected by rupture of the cyst, with extrusion of its contents into the intestine or vagina, or into the sac of the peritoneum whence they are removed by absorption. I have never seen a case where the fluid has been discharged through the Fallopian tube; and I believe that, in all probability, the examples which have been recorded of such an occurrence have been instances of dropsy of this canal owing to inflammation combined with obliteration of its orifices.

The fourth and last plan is by abdominal section, and the removal of the entire growth through the wound.

Before describing the operation of ovariotomy it may be mentioned, that my guiding rule in all cases of ovarian cystic disease is this:—When the tumour is not increasing in size, is not affecting the patient's health, and is unproductive of any unpleasant symptoms beyond those resulting from its weight, I do nothing at all, merely directing the patient to see me in the event of any change. These cases are unfortunately very rare. Supposing that the tumour is small but gradually growing larger, there can be no objection to trying to retard such growth by administering chlorate of potash. This salt never does any harm, and I cannot help thinking that I have seen small tumours remain stationary in consequence of its free exhibition. As a matter of fact, however, much more than simple palliative treatment is needed in the majority of cases. We have really to decide between paracentesis and ovariotomy; in doing which regard must be had to the patient's health, constitution, age, the condition and nature of the tumour, the presence or absence of firm adhesions, &c. Where there is any hope of cure from paracentesis, it is of course to be resorted to in preference to attempting the removal of the tumour; but in certain cases, and especially in the multilocular tumours, ovariotomy is the only proceeding which offers a reasonable chance of rescuing the patient from an early and very painful death. Taking into consideration all the examples of this operation which have been published, it appears that success has followed in about two cases out of three; while with greater care in the selection of cases than has yet been generally exercised the results will probably be more favourable.

The mode of performing *ovariotomy* remains to be described. And first, with regard to the preparation of the patient it is only necessary to say that she should be in her usual health, that the bowels ought to be properly relieved every day for some time before the operation, and that solid food must be avoided on the day that the tumour is to be removed. If the operation can be performed about a week after the catamenial period, so much the better.—Secondly, the temperature of the apartment is to be raised to about 70° Fahr., while it is advisable to render the air moist with steam. A good nurse should be present, who is to take charge of the patient afterwards. The duties of the assistants are to be arranged beforehand; while no one is to approach the patient who has been in the post-mortem room for two or three days previously, or who has been in attendance upon any case of erysipelas or puerperal peritonitis or scarlet fever, &c. The operator will take care to have ready on a handy tray such instruments as scalpels, strong scissors, a broad director, two large trocars with elastic tubing connected with the cannulæ, strong vulsellum forceps, artery forceps, a couple of clamps, one or two cauteries, needles with and without handles, silver wire for sutures, and strong hemp ligatures. A supply of new fine sponges, flannels, lint, adhesive straps, towels, ice, basins of warm water, and one or two pails will also be required. An excellent operating table may be made by covering an ordinary dressing table with three or four blankets and a piece of impermeable cloth, and putting some firm pillows at the head. The bed which the patient is afterwards to occupy ought to be in the same apartment.—

Thirdly, the patient lying upon her back, with the head elevated, and the dress so arranged that the abdomen can be thoroughly exposed, is to be put under the influence of chloroform or ether. The operator having passed the catheter so as to be certain that the bladder is empty, then makes an exploratory incision in the linea alba; commencing about two inches below the umbilicus, and carrying it downwards for three or four inches. Easy as it may appear to cut down through the peritoneum, the most experienced operators are sometimes puzzled to know when they have reached this membrane; inasmuch as this serous sac bulges forward and often looks very much like a portion of the bowel, or it resembles the wall of the cyst. The peritoneum can, however, always be distinguished from intestine by making one or two taps on the finger laid over it; the percussion note being dull, unless there be a portion of bowel present. To discriminate between the peritoneum and the cyst is more difficult, and needs a sharp eye with a delicate touch; many cases being known where gentlemen have proceeded to separate this structure from the superimposed transversalis fascia, under the belief that they were merely breaking down adhesions between the tumour and the lining membrane of the abdomen. However, the peritoneum having been divided, and the ascitic fluid which is usually present having been allowed to escape, the hand (dipped into warm water) is to be introduced so as to learn whether any adhesions are present. If any be found they should be cautiously broken down. When the cyst is freed it begins to bulge through the wound, and the trocar is then to be introduced at the most prominent part, taking care that none of the fluid escapes into the abdominal cavity. As the sac gets emptied, its walls are to be grasped with a pair of strong vulsellum forceps, and traction exerted so as to withdraw the whole tumour. While an assistant keeps the intestines within the abdomen by pressure with one or more fine new flannels wrung out of warm water, the operator takes care that the tumour is nowhere adherent to the omentum, and examines the pedicle. Finding that all is clear, he applies the clamp (nothing answers better than the common carpenter's callipers) as tightly as possibly round the latter and as near the tumour as possible, and then cuts off the greater bulk of the tumour. For by leaving a small portion about the size of half an orange, to be removed at the end of twenty-four hours, all fear of slipping and secondary hæmorrhage will be prevented. The other ovary having been examined and found healthy, the wound is to be quickly closed by silver wire sutures. These had better be introduced about an inch apart, by means of a needle with a handle; and I believe it is better to pass the sutures through the entire abdominal wall, just including the edges of the peritoneum. The portion of tumour left outside, with the clamp, is then wrapped in lint; three or four long strips of strapping are applied completely round the body, so as to cross over the wound;

and a suppository of two grains of opium is introduced into the rectum, or—and it answers better—half a grain of morphia is injected under the skin. The patient is then lifted into bed; and if the administration of the anæsthetic has been well managed, consciousness will not return until she has been comfortably arranged.

There are one or two significant points in the foregoing operation which had better be mentioned before speaking of the after-treatment. The most important is as regards the management of the pedicle. Now although the clamp has been just recommended, yet I am sure it will often be advantageous to dispense with this instrument; for it cannot be denied that keeping the pedicle outside the abdomen retards the healing of the wound, while months afterwards the traction exerted may be the cause of very annoying dragging pains. To obviate these inconveniences, the pedicle has been secured with strong hemp ligatures; and these having been cut off short, the stump has been returned into the abdomen. The late Dr. Tyler Smith had great success with this plan; and I have seen it answer admirably in the hands of Sir William Fergusson, as well as in some of my own cases. Dr. Marion Sims transfixes the pedicle with a double silver wire, and dividing it twists each wire tightly round half the pedicle. The ends of the wire are then cut close off, the tumour is separated from the pedicle, and the latter with its ligatures dropped into the pelvis. The metallic ligature becomes entirely imbedded in the structure of the pedicle, the tissue cut by it overlapping the wire and healing over it, so that even strangulation does not occur as with a silk or hemp ligature. It is an excellent practice; though I doubt if it be as generally applicable as the division of the pedicle by the actual cautery. He has also recommended that an opening should be made from the recto-uterine cul-de-sac into the vagina, through which a drainage tube is to be passed for the purpose of conveying away any fluid which may accumulate here. With the actual cautery the late Mr. Baker Brown had a succession of favourable cases; and it is decidedly a valuable proceeding, especially where the pedicle is thick and short and fleshy. For long and thin pedicles the ligature, cutting it off short and letting the whole fall into the pelvis, is more suitable. In one instance where I had recourse to this cautery, it answered perfectly; for although the case ended unfavourably, yet death only occurred five days after the operation, and could in no way be attributed to the manner in which the pedicle had been treated. When adopting this practice, the pedicle is compressed with a clamp invented by Mr. Clay, of Birmingham; and the tumour is then removed by dividing the pedicle with the cautery at just below a white heat.—There has been much unnecessary discussion with regard to the length of the wound. The best plan is to make the incision as already recommended; and then enlarge it, rather than try by force to bring a large mass of semi-solid matter through a small opening. Where the tumour is of the unilocular kind, or where there are only two or three cysts which can be each emptied by the trocar, a short incision of course suffices.—Then with respect to adhesions, care will be necessary lest when they have been broken down they give rise to hæmorrhage. To prevent this their site should be examined before closing the wound, so that if blood be escaping the bleeding points may be lightly touched with the cautery. If the omentum be wounded, one or more ligatures had better be applied, and the ends cut off short, instead of bringing them out at the wound.—And lastly I would advise the surgeon to dispense with all kinds of bandage after the operation. Having very seldom used one, I can certainly affirm that such an appliance is unnecessary; while it is no little advantage to have the arrangements such, that the wound can be inspected without disturbing the patient.

The more simple the after-treatment, the better. If there be thirst, or troublesome sickness, ice ought to be freely sucked. Then, for nourishment during the first twenty-four hours, iced milk, and the yolk of a new-laid egg beaten up in water with a teaspoonful or two of brandy will suffice. If there be no sickness, and if all be going on well, white fish with a glass of sherry and water may be allowed on the second day; while on the following, a mutton chop should be given. When there is much vomiting, however, we must trust to enemata of milk, beef-tea, &c. In those cases where I have employed the clamp, the part of the pedicle and tumour above this instrument has been cut off close at the end of twenty-four hours; and then two days subsequently the clamp itself has been taken away. The wire sutures through the edges of the abdominal incision have seldom been withdrawn before the fifth, and often not before the eighth or ninth day; long slips of strapping being then employed until the wound has healed. It need scarcely be added that the air of the patient's room must be kept most pure, that the temperature should be about 60°, and that the strictest quiet ought to be maintained. If any symptoms of general peritonitis set in, linseed poultices, hot fomentations, and opium are the remedies to trust to. Caution will be necessary with regard to stimulants, avoiding both extremes; that is to say, while not commencing them too soon, care must be taken not to defer their administration until it is too late.

Several years since I proposed, that in those cases where the abdominal section was made and it was found impossible to remove the tumour owing to the presence of extensive adhesions, the pedicle should be tightly tied after the withdrawal of the fluid contents of the cysts by tapping. Thus it was hoped, that whilst the supply of blood furnished to the growth by its adhesions might be sufficient to prevent gangrene, the obstruction of the main arterial channels would prevent the fluid from being secreted anew. In truth, however, this suggestion is of little value. For in almost all cases where adhesions exist they will be found in the pelvic cavity; and consequently the application of a ligature around the pedicle is as difficult to accomplish as the removal of the tumour itself. Still it may be as well to call attention to the suggestion; so that if by chance an instance should occur where the pedicle is found free from the surrounding structures, other circumstances preventing the removal of the cyst, such a pedicle might either be ligatured or secured by acupressure.

3. DISPLACEMENTS OF THE OVARY.

The displacements to which the ovary is liable are of two kinds,—those where one or both glands are forced out of position by some uterine or other tumour, and those where the ovary escapes from the pelvis as a hernia.

The displacements of the first class chiefly aggravate the symptoms of the disease causing them. In addition, however, they will frequently be the cause of considerable suffering. Thus, a small fibroid tumour of the uterus may be accompanied with severe dysmenorrhœa, with attacks of nausea, and with pain; these troubles ceasing as the tumour enlarges and passes upwards out of the pelvic cavity, so as to allow the ovary to occupy its normal position. Under the head of prolapsus of the ovary, Dr. Rigby has described a condition in which this gland has descended between the rectum and uterus—into the recto-vaginal pouch. Complaint is made of a sense of forcing and throbbing at the lower part of the abdomen, of backache, pain in the groin of the affected side, indigestion, sickness, difficulty in passing the fæces, &c.; these symptoms coming on in paroxysms. There is also dysmenorrhœa, with the passage of clots and portions of membrane. If a vaginal examination be made, the ovary will be found swollen, exquisitely sensitive, and occupying the recto-vaginal pouch; the pain produced by the examination, like that caused by the passage of a solid motion, continuing for hours afterwards. The treatment should consist in the exhibition of mild aperients, so as to clear out the intestinal canal and prevent further accumulation of fæces; in the use of the iodide of lead and belladonna pessaries (F. 423), so as to reduce the ovarian swelling and tenderness; and in rest on the sofa, with the avoidance of sexual intercourse. Under such management, the ovary will sometimes be restored to its natural position; or we may be able to gently raise it with the finger, and perhaps to keep it up by the introduction of an elastic pessary.

In the second set of cases, the ovary has escaped out of the pelvis, constituting a true hernia of the gland. This condition is sometimes congenital, but it may also happen accidentally after puberty; while it can take place on one side of the body only, or on both sides. The ovary has escaped from the cavity of the pelvis either at the inguinal ring, or at the crural arch, or through the tissues of the vagina, or at the sciatic notch like an intestinal ischiatic rupture. From the anatomical relations of the pelvic viscera it can be readily understood that hernia of the ovary occurs more frequently at the inguinal ring than at any other site; the passage of the round ligaments through the internal abdominal ring, and along the inguinal canal to the labia majora, leaving a weak point. The hernial sac may contain the ovary alone; or with this gland there will possibly be a portion of intestine, the Fallopian tube, and even the uterus.

The history of a peculiar case in which the left ovary was found in the sac of an oblique inguinal hernia, was related at the Royal Medico-Chirurgical Society by Mr. Holmes Coote. The patient, a young woman, was admitted into St. Bartholomew's Hospital with a swelling in the left groin, and suffering from the symptoms of strangulated hernia. In the course of a few hours the usual operation was performed, when the ovary and the Fallopian tube were found in the sac. A similar malposition of parts was subsequently noticed on the opposite side of the body. The left ovary was removed, some thickened omentum carefully cut away, and the patient put to bed; but the sickness and constipation continued, and she died four days after the operation. The cause of the sickness, &c., was displacement of the stomach and transverse arch of the colon. The most remarkable feature in the case, however, was that the woman said she had always menstruated regularly. Now, on the examination of the body, it was found that both ovaries were *well developed*, and that the formation of the Graafian vesicles was going on naturally; but the Fallopian tubes were quite impervious, the uterus was completely absent, and the vagina was a short canal—an inch and a half in length terminating in a thin membrane. She said that she had been menstruating in the customary manner the week before her admission; and some of the female attendants at the hospital noticed the usual marks, though faint, upon her dress. If this were so, the menstrual discharge could only have taken place from the mucous lining of the imperfect vagina.

An example of hernia of the right ovary, in which this gland was successfully removed, has been reported by Dr. Meadows.* In this case the patient was twenty-three years of age, single, and from birth had had a swelling in the right inguinal region. At fifteen she began to menstruate; but it was only five years afterwards that the swelling commenced being painful, when another one appeared just below it. At the next monthly period this second tumour became the seat of considerable suffering, and it increased much in size. From this time the pain was violent at each period, while the tumour would swell up to the size of two fists and be exquisitely tender to the touch. Dr. Meadows having decided that this tumour was ovarian (the upper being probably an omental hernia), got Mr. Lawson to excise it; when it was found to consist of the right ovary, measuring two inches in length and one in diameter, and in a state of cystic degeneration. The operation proved eminently successful.*

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* *Transactions of the Obstetrical Society of London.* Vol. iii. p. 438. London, 1862.

Speaking generally, surgical treatment is seldom to be practised in these cases. When the hernia is recent, attempts ought to be made to reduce it; and then, if success should follow these efforts, a well-fitting truss should be worn to prevent any recurrence of the ovarian descent.

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* For other examples of ovarian hernia see the Author's *Signs and Diseases of Pregnancy*, Second Edition, p. 450. London, 1867.

PART XIV.

DISEASES OF THE SKIN.

The early writers on skin diseases separated the study of these affections from general pathology, and thereby committed no small amount of mischief. For medical men having thus been led to regard dermatology as a speciality—to look upon skin eruptions as simply disorders of either the epidermis (cuticle) or of the derma (cutis), took but little pains to acquire any accurate knowledge of them; so that from inexperience they were led to believe that cutaneous affections were multitudinous in their nature, very confused in their respective appearances, particularly rebellious to treatment, and governed by pathological laws at variance with those controlling other structural diseases. It is only during the last few years that more enlightened opinions have prevailed: that practitioners have begun to see how these disorders are chiefly brought about by the relationship between the blood and the investment of the surface of the body being disturbed,—such disturbance being originated sometimes by an alteration in the composition of the blood, sometimes by modified blood-distribution owing to morbid changes in the nervous centres or in the nerve-trunks, and sometimes by disordered changes in the cells of the skin tissues secondarily affecting the blood and nerves.

Although the division of cutaneous affections into Orders or Classes assists very materially to simplify their diagnosis and management, yet the student must not expect to find these disorders always existing in one simple form. On the contrary, we frequently see two or three in combination, as in the coexistence of scabies and eczema, or of urticaria and lichen. So again, one source of irritation may produce a different eruption in different individuals. Thus, the effect upon the skin of wearing clothing dyed with the brilliant coal-tar colours will be the production of troublesome excoriations in some individuals and of stubborn nettle-rash in others; while socks coloured with these poisons may give rise (as Mr. Webber has clearly shown) to obstinate irritation only, or to protracted pain and lameness—not to mention the symptoms of general poisoning. Again, the ingestion of some particular kind of food will set up urticaria in one person and erythema in another; while the Acarus scabiei can give rise to a vesicular, pustular, or papular rash, according to some peculiarity existing in the supporter of this parasite.

The classification which it is proposed to adopt in these pages is that of Willan, considerably modified. There are certainly much more ambitious and extensive arrangements to be found in our various systematic treatises; but their value can be judged of from the fact that most special writers on these affections ignore the classification adopted by their predecessors and contemporaries, although at the same time they confess that the day for suggesting a perfect synopsis has not yet arrived. While hoping therefore that our knowledge may become sufficiently precise to enable us to draw a distinct line between the essentially local and essentially constitutional skin diseases, to determine the exact causes of both kinds, as well as to show in what part of the cutaneous structure the different disorders have their seat,—while waiting and hoping for this good season it seems useless to adopt a confessedly imperfect plan because it is novel. Willan's classification has at least the merit of having lived for more than sixty years, of being based on the *visible* characters of the disease, and of being simple and intelligible. The different orders are as follows:—

ORDER 1. *Exanthemata.*—Erythema; roseola; urticaria.
ORDER 2. *Vesiculæ.*—Sudamina; herpes; eczema.
ORDER 3. *Bullæ.*—Pemphigus; rupia.
ORDER 4. *Pustulæ.*—Ecthyma; impetigo.
ORDER 5. *Papulæ.*—Strophulus; lichen; prurigo.
ORDER 6. *Squamæ.*—Psoriasis (including lepra); pityriasis; ichthyosis.
ORDER 7. *Tubercula.*—Elephantiasis Arabum; molluscum; acne; frambœsia; keloid; vitiligo.
ORDER 8. *Parasitici.*—Tinea tonsurans; tinea favosa; tinea decalvans; tinea sycosis; tinea kerion; tinea versicolor. Scabies; phthiriasis, &c.

The order "Maculæ" [*Macula* = a stain or blemish] has been omitted. This has been done partly because it is often a matter of little moment whether portions of the skin are marked by the presence of too much or too little pigment; and also for the reason that where the discoloration is thought to be a symptom of an important constitutional affection (as in Morbus Addisoni), it is better to describe such disease in its proper place rather than give undue prominence to only one of its symptoms, especially as that one is often the least important. It may of course be said that the greater number of skin diseases, properly so-called, are secondary affections; but then it should be recollected that in these, the visible sign of the constitutional derangement is of greater significance than the derangement itself. On the opposite principle jaundice, purpura, typhus, and enteric fever might be regarded as cutaneous diseases. Whether therefore there is an excess of pigment (as in freckles, moles, pregnancy, and Addison's disease), or a deficiency (as in leucoderma and albinism), is a matter of little consequence. The actual discoloration which results cannot generally be remedied.

Skin diseases will be materially modified according as the patient is strumous, anæmic, plethoric, gouty, rheumatic, or dyspeptic; as well as by the age and sex, the mode of life, and the residence of the sufferer; and by the condition of the uterine functions in women. These affections may also be considerably altered by, or entirely dependent on, a syphilitic taint.

There is no skin disease which the practitioner need be afraid of curing. The public has become imbued with the idea that suddenly "to drive in" an eruption is a proceeding often followed by very grave symptoms—by apoplexy, hæmorrhage from the bowels, internal inflammations, &c. Extended experience gives no countenance whatever to this opinion. On the contrary, it is to be regretted that cutaneous diseases cannot be cured as quickly as may be wished. Like other disorders, a skin eruption is mischievous: it sets up considerable irritation, while it is often a proof of a vitiated state of the vascular or of the nervous system.

In attempting to cure diseases of the skin, we have to resort to constitutional and local remedies; the former being, as a rule, by far the most important. Speaking generally, our object in employing *constitutional* treatment is twofold. Thus, we endeavour to *eliminate* from the system the morbid matter upon which the eruption depends; and this can best be done by the proper use of purgatives, diuretics, and often of diaphoretics. Then we have to try and *alter* the constitutional state which led to the formation of the poison, and so restore the healthy tone of the body; a proceeding which will usually be most readily effected by the careful use of such medicines as the mineral acids, the alkalies with vegetable bitters, iodine, arsenic, phosphorus, quinine, steel, cod liver oil, colchicum, tar, creasote, bichloride of mercury, bark, &c. The *local* remedies (amongst which are included hot air, vapour, hot and cold water, and medicated baths) are of considerable value in assisting the radical cure of the disease, as well as in moderating irritation and pain; while in the class of Parasitic disorders they can often be alone trusted to for giving permanent relief.

The diet may always be nourishing and sufficient in quantity to satisfy the patient's demands. Cocoa or chocolate, milk, sherry and soda water, or claret; white fish, mutton, beef, chicken, and game; together with fresh vegetables, bread and butter, and light suet puddings,—these are all unobjectionable articles of diet. On the contrary, it will be advisable to forbid tea and coffee, but especially the latter; as well as beer, raw spirits, sugar, pastry, most salt meats, and indigestible fruits. There must be the most strict attention to cleanliness. The patient ought to wash with warm soft water, using a thick downy towel; resorting to oatmeal, or starch, or arrowroot, or glycerine in the place of soap when the eruption is at all irritable. If any soap be used, however, the transparent glycerine soap found at most chemists is preferable to other kinds. To clean the scalp nothing is more efficacious than the yolk of an egg and warm water; though in the parasitic affections soap (especially the officinal soft soap, or the carbolic acid soap) may always be freely employed. It is also better that flannel should not be worn next to that part of the skin which is affected; chamois leather proving an excellent substitute where, owing to general delicacy, it is necessary that the body be warmly clothed. And then, the physician in giving directions as to treatment must recollect that a caution will be necessary with regard to those eruptions which are contagious. When the skin of a nursing woman begins to present any eruption indicative of a cachectic state of constitution—*e.g.*, ecthyma, rupia, pemphigus, &c.—she ought at once to wean her infant; while no female with elephantiasis, lupus, or any one of the syphilitic cutaneous disorders, should be allowed to suckle her child for a single day.

ORDER I. EXANTHEMATA.

The exanthemata [’Εξ*άνθημα*, from *ἐξανθέω* = to blossom or break out in an eruption] consist of variously formed superficial reddish patches, varying in intensity and in size, disappearing under pressure, and terminating in resolution or desquamation. There are neither vesicles nor pustules, neither papules nor scales. The small bloodvessels are overloaded with blood. The exanthemata are frequently complicated with gastro-intestinal irritation or inflammation, and sometimes with cerebral or pulmonary diseases. This order includes erythema, roseola, and urticaria. By many dermatologists, erysipelas, measles, and scarlatina are regarded as exanthematous diseases; but such an arrangement seems to have only the questionable advantage of making the class as comprehensive as possible.

1. ERYTHEMA.

Erythema [from ’Ε*ρυθαίνω* = to redden or cause blushing], inflammatory blush, *efflorescence cutanée*, is a non-contagious affection; characterized by slight superficial red patches, which are irregularly circumscribed, of variable form and extent, and which subside on pressure. The patches are most frequently seen on the face, chest, and extremities. The duration of erythema often varies from a week to a fortnight. It is preceded, though rarely accompanied, by febrile symptoms: it causes but slight heat, and no pain; and the prognosis is always favourable.

Several varieties of this disorder are usually enumerated. Thus there is *erythema fugax*, so named from its fleeting nature; in which transient patches of redness appear about the face and neck, accompanied by heat and tingling. This form is generally due to some derangement of the stomach or other part of the alimentary canal. *Erythema intertrigo* is commonly produced by friction between folds of the skin, where the secretions are not removed by washing. The parts about the neck, groins, lower part of abdomen, &c., are apt to become thus affected in obese women and children. Occasionally this rash is superseded by slight and superficial ulceration. *Erythema pernio* is the technical name for the peculiar inflammation of the skin which constitutes an unbroken chilblain. *Erythema circinatum* is very seldom met with. There are usually round red circles, or segments of circles, with well-defined rims outside. The ring-shaped patches are slightly raised: each lasts for rather less than a week, and is perhaps succeeded by a fresh patch. It comes on during the progress of rheumatic fever, especially in young women. Then there is *erythema læve,* which is developed on the lower extremities when they become anasarcous owing to renal or cardiac dropsy, &c. The skin is red and hot and glistening: the limb looks like brawn. The obstructed circulation through the limb leads to more and more exudation; and this, if unrelieved, gives rise to the formation of cracks and excoriations, or of small blisters, that burst and discharge quantities of serum, or often to deep ulcers which may end in mortification when severe. But the most curious species of this disorder is that known as *erythema nodosum;* in which the eruption is confined to the fore part of the leg, taking the form of one or more large oval patches running parallel to the tibia, and rising into painful protuberances much resembling nodes. Erythema nodosum occurs commonly in children, youths, and young women badly nourished or overworked. *Erythema tuberculatum* and *erythema papulatum* are merely modifications of erythema nodosum; the patches consisting either of tubercles or papules, which are scattered over the face and neck, upon the arms and legs, &c.

After certain injuries and surgical operations a rash now and then appears over the body resembling that seen in scarlet fever. It has been already noticed that I believe this eruption is of an erythematous nature. Some authorities regard it as a kind of roseola. Mr. Morant Baker describes it under the term *Erythema serpens.*

Erythema is often mistaken by the public for erysipelas. Patients say that they are liable to attacks of erysipelas, and wish for some remedy to prevent this disease. In nine cases out of ten it will be found that the disease is erythema, though the sufferers are very unwilling to be persuaded that they have not been the victims of the severe disease.

The *treatment* is very simple if the cause can be removed. A few doses of some mild saline aperient, such as the effervescing citrate of magnesia, or the compound rhubarb powder, do good at the onset. Then warm water or vapour baths; light diet; and tonics (especially quinine, or the compound tincture of bark, or the mineral acids) are sufficient for the cure of most forms of this affection. Any derangements of the digestive, urinary, or uterine functions which may be present, must be remedied. For some varieties a local application will be required, and then the dilute solution of subacetate of lead can be used. In erythema nodosum the officinal ointment of veratria may be employed, if there be much tenderness; while quinine is being simultaneously administered to effect a cure. The annoyance of erythema intertrigo will be greatly relieved by washing the part every few hours with the lead lotion, thoroughly drying it, and then dusting it over with the oxide of zinc. The carbonate of zinc also forms a good dusting powder; as does the native carbonate of zinc (calamine) which is adulterated with sulphate of baryta and oxide of iron. Warm gloves or stockings, friction with a stimulating liniment, animal food, and the administration of cod liver oil will remove unbroken chilblains. And lastly, in erythema læve the limbs ought to be raised so as to favour the return of blood from them; while the skin should be punctured here and there with a lancet or a needle, in order that the collected serum may drain away.

Many years ago an epidemic of erythema prevailed in Paris to which the name of *Acrodynia* was given. The eruption, however, was but an unimportant feature in a severe constitutional disorder; regarded by Chomel and others as originating in the consumption of diseased grain. Certainly the symptoms (vomiting, diarrhœa, facial œdema, muscular pains, fever, boils, uræmia, &c.) seemed to point to some such cause. The mortality was large.

2. ROSEOLA.

Roseola [Dim. *Rosa* = a rose], rose-rash, or false measles, consists of a non-contagious and diffused and inflammatory mottling of the skin, which runs its course without producing more than very slight constitutional disturbance. The rash is characterized either by transient patches of redness, of small size and irregular form, distributed over more or less of the surface of the body; or by the formation of numerous, small, slightly raised, rose-coloured spots. The eruption, at first brightly red, gradually subsides into a deep roseate hue, and slowly disappears. It is accompanied by slight fever, and sometimes there is redness about the fauces. The rash fades after a duration varying from three to seven days.

Sometimes this eruption simulates measles, or more frequently it resembles simple scarlet fever. Coryza is never present, however, nor is the rash of a crescentic form, as in measles; though there is often soreness and redness of the fauces, with gastric disturbance, as in scarlatina. Belladonna now and then produces rose-rash. So does derangement of the stomach. In infancy, dentition will at times cause it. The eruption of small-pox is at times preceded by *roseola variolosa.* About the fifth day after vaccination, when the vesicle has formed, an eruption of *roseola vaccinia* now and then spreads over the body; this state being attended with febrile disturbance. An epidemic of roseola (described under the names of rosalia, rubeola notha, anomalous exanthem, &c.) which prevailed in London during 1863-64, was in all probability caused by some peculiar atmospheric condition.

There is one form of this affection which frequently affects adults, especially females, in the summer. This is called *roseola æstiva.* Women of an irritable system, with irregularity of the uterine functions, are mostly attacked. The disorder is preceded by chills and smart fever; while, when the eruption appears, the fauces often become affected. The rash and general symptoms disappear on the fifth day.

But little *treatment* is usually necessary for the cure of these rosy eruptions. Mild alteratives or laxatives, a plain diet with lemonade, a few doses of one of the mineral acids with any bitter infusion, may in some cases be required. Where the eruption occurs in children during dentition, the gums ought to be lanced if they are tender and swollen.

3. URTICARIA.

Urticaria [from *Urtica* = a nettle], or nettle-rash, may be described as a non-contagious exanthematous eruption. It is characterized by the formation of prominent patches or wheals (technically known as pomphi), which are either red or white, of regular or irregular shape, and of uncertain duration. They are probably produced by contraction of the smooth or unstriped muscular fibres of the derma, with a slight exudation of serum. These wheals, whether few or numerous, large or small, bandlike or round or irregular in outline, &c., are accompanied (especially at night) by intense heat, a very annoying burning and tingling, and great itching.

There are two varieties: one in which the disease is *acute,* running a short, rapid course; another in which it is *chronic,* very obstinate, and either persistent or intermittent. Both forms attack individuals of all ages and constitutions. The acute variety commences with febrile symptoms—frequent pulse, dry skin, white tongue, headache, pyrosis, and epigastric tenderness; all which, however, rapidly diminish as the eruption comes out.

This may happen almost suddenly, and cover various parts of the body; or the wheals may appear in one district and fade, and then again in another, and so on. The chronic intermittent variety is the *urticaria evanida* of Willan. There is no marked constitutional disturbance. The rash is very irritating: it sometimes lasts for months or even years. Acute and chronic nettle-rash assume different appearances. Hence, the terms urticaria evanida, u. perstans, u. conferta, when the wheals rapidly vanish, or remain a longer time than usual, or are closely packed together respectively; u. subcutanea, when the wheals are less superficial and fissured more deeply than usual, forming gravescent tuberose subcutaneous swellings; and u. tuberculata when the wheals are very large and nodular.

Urticaria is often caused by certain derangements of the digestive organs. These derangements arise from the use of particular articles of diet, such as shell-fish of different kinds, cucumbers, mushrooms, cheese, nuts, bitter almonds; or from the employment of peculiar medicines, as nux vomica, henbane, turpentine, and balsam of copaiba, &c. Urticaria is also seen occasionally in connexion with uterine irritation; or mental anxiety, sudden emotion, over-fatigue, rheumatism, dentition, &c., may induce it. In certain cases attacks of asthma and urticaria seem at times to replace each other. The bites of gnats and bugs and fleas, as well as the irritation of pediculi will now and then induce rebellious nettle-rash. A more transient form is caused by contact with the jelly-fish (Medusa pelagica), with the common nettle (Urtica urens), &c. Patients are occasionally met with whose cutaneous nerves are so susceptible that slight pressure with the finger, or any attempt at scratching, will produce a patch of urticaria.

The *treatment* of acute urticaria must consist in the administration of emetics and saline purgatives, where the disease depends upon stomach derangement. In the chronic form, a simple diet (without wine, beer, spirits, or tea and coffee) ought to be rigidly adhered to; while laxatives, antacids (especially bismuth, F. 65), and tepid or cold baths, are the chief remedies. The Turkish bath is serviceable at times. Such preparations of steel as can be readily assimilated (F. 394, 401, 403) will often effect a cure. In obstinate cases, where there are no symptoms of gastro-intestinal irritation, small doses of arsenic (F. 52, 399) may be required. If the patient be gouty, colchicum (with or without alkalies, F. 46) should be tried. Quinine is serviceable where the attacks recur with any approach to periodicity. Cod liver oil cures some cases. Aconite has been recommended. The irritation can be relieved by the common lead lotion, or by sponging with equal parts of vinegar and water, or by a solution of corrosive sublimate (F. 271, 276) frequently applied. Flannel underclothing always aggravates the itching and heat: the abnormally sensitive skin requires to be soothed, as well as to be kept scrupulously clean.

ORDER II. VESICULÆ.

A vesicle is a slight elevation of the epidermis, containing a serous fluid—generally transparent, but occasionally opaque or sero-purulent. The fluid may become absorbed; or it will be effused upon the surface, causing excoriation and small thin incrustations. Some vesicles are umbilicated, *i.e.*, they have a central depression: some are acuminated: most are globular. Vesicular eruptions are occasionally preceded by fever, but often break out imperceptibly. They give rise to a peculiar appearance, as if drops of water had been scattered over the surface of the skin; they may appear upon any part of the body; and they are not unfrequently more troublesome to cure than would be anticipated from their apparently slight nature. In this order we find three affections—sudamina, herpes, and eczema. Varicella, vaccinia, and scabies are often also included; but the first two may be much more appropriately placed among the eruptive fevers, while the third is a parasitic disease.

1. SUDAMINA.

During the progress, and especially towards the favourable termination of many acute and chronic diseases attended with sweating, crops of small transparent vesicles make their appearance. Thus, in acute rheumatism, typhus, scarlatina, enteric fever, &c., sudamina [*Sudo* = to sweat] are frequently found upon the trunk and extremities; especially in the latter stages of these affections. Owing to their minuteness and transparency these vesicles are apt to be overlooked, but they can usually be felt like firm little beads under the cuticle. The skin around their bases is not inflamed. They are most frequently developed upon the front of the abdomen and chest: they are sparse and scattered, or numerous and grouped in patches: frequently as one group dries up after a duration of twenty-four hours, a fresh eruption takes place: and as a rule they remain clear and transparent throughout their whole progress, their acid watery contents never becoming purulent.

Some authors speak of *Miliaria* [*Milium* = millet] as a distinct fever, arising from constitutional causes, and differing from sudamina produced by copious sweating. Such a view is in all probability erroneous. The distinction between the two is slight. The vesicles in miliaria are the result of sweating, but possibly of a sweat which is more acrid and irritating than that which causes sudamina. Thus, in a mild variety of rheumatic fever we may find sudamina, while in a severe form there will be miliaria. Miliary vesicles are rather opaque, somewhat irregular in form, and often present a slight red margin at their bases; while their acid (now and then alkaline) contents are more or less turbid. These vesicles often produce irritation; which is best relieved by sponging with warm water containing a little soda. Miliary eruptions are said to have occasionally been epidemic, and then they have been thought to be attended with considerable danger.

2. HERPES.

Herpes [from Ἕρπω = to creep], or tetter, is a transient non-contagious affection, consisting of clusters of vesicles upon inflamed patches of irregular size and form. In some respects, however, herpes resembles the exanthemata, while in others it is like a neurosis.

The eruption runs a definite course, rarely continuing for more than two or three weeks; while it is not usually severe, leaves scarcely perceptible scars (except in shingles), and is not usually accompanied by any constitutional symptoms. Care must be taken not to mistake its nature; since *herpes preputialis* has been actively treated for syphilis, and *herpes circinatus*—when occurring on the scalp—for tinea tonsurans, or ringworm. In a common cold, a cluster of herpes will usually be found upon one of the lips constituting *herpes labialis*. A singular and sometimes obstinate species of this disease is named *herpes zoster*, or *zona*, or *shingles*; the inflamed patches with their clustered vesicles being arranged in the form of a band along the course of one or more of the intercostal nerves, encircling half the circumference of the body and stopping at the median plane. In the greater number of cases the zone will be found to occupy the right side of the body. This variety has frequently a duration varying from fourteen to twenty-one days, it occurs only once (as a rule) to the same individual, it leaves small scars, and it causes severe stinging hot pains of a neuralgic character, which in old people may be extremely severe and obstinate, lasting for a long time after the eruption has disappeared. Herpes occasionally appears in the course of other cutaneous nerves, from the cervical, brachial, or lumbar plexus, following their distribution with great accuracy. There are feverish symptoms, headache, lumbar pains, constipation, and attacks of chilliness; while although the vesicles usually dry into little scabs, yet at times they ulcerate somewhat extensively. Herpes zoster is popularly regarded with great fear; and village nurses assert that death is certain if the patches extend round the body. There is, however, no danger, unless the patient be particularly old and feeble.

In *herpes zoster frontalis*, or *herpes ophthalmicus*, or *brown shingles*, the small vesicles appear on the forehead, on the upper eyelid, and on the side of the nose in the area of the ophthalmic division of the fifth nerve. One district may be alone affected, or all three regions. Often the disease is limited to the distribution of the right or left supra-orbital nerve; which nerve may be the seat of neuralgia for some days before the rash appears. The eruption is always confined to one side: it is often the cause of much pain; and is very apt to leave little pits, or even large irregular scars, which are permanent. When the herpes appears on the side of the nose in the distribution of the nasal branch of the ophthalmic nerve which also sends branches to the interior of the eye, the various tissues of the eye are very liable to become inflamed, the morbid action possibly giving rise to considerable mischief. The disease is most liable to be mistaken for erysipelas; from which, however, it can be distinguished by the comparative mildness of the constitutional symptoms, and by the lateral arrangement of the rash. The pain is not only very severe at the time, but it lasts for some days after the vesicles have disappeared. The latter generally happens within fourteen days from their commencement. The remedies consist of quinine, and the use of lead lotion.*

Very little is necessary in the way of *treatment* beyond attention to the bowels, and regulation of the diet. The local irritation may be relieved by the application of zinc ointment, or the officinal ointment of subacetate of lead, or the dilute solution of the same salt; or by dusting the part with powdered starch. Herpes zoster is sometimes followed by a neuralgia of the affected part which is difficult to relieve. In these instances hypodermic injection of morphia, or friction with the aconite liniment may perhaps remove the pain; but if it be severe or obstinate, a mixture of quinine and arsenic (F. 52) will usually prove curative.

3. ECZEMA.

Eczema [from 'Εκζέω = to break forth in pustules], humid tetter, or running scall, is a very common non-contagious disease; consisting in well-marked cases of an eruption of small vesicles on various parts of the skin, closely crowded together, and often running into each other so as to form, on being ruptured, superficial moist excoriations, from whence exudes a sero-purulent discharge. The heat and inflammation and serous infiltration of the affected part, the irritation and tingling produced by the scabs or crusts, as well as the pain of the fiery red or raw surface which results, all tend to produce considerable fever and restlessness. The serous secretion may be thin and clear, or thick and yellow and glutinous. Eczema is more often a chronic than an acute disorder.

A few years ago Dr. M'Call Anderson, following Hebra, asserted that the elementary lesion in eczema is not necessarily a vesicle: it may be a pustule, a papule, a fissure, or a patch of erythema, cases being seen which present all these lesions in combination. Similar views are held by Mr. Erasmus Wilson; but Dr. Tilbury Fox still maintains that the disease is essentially a vesicular one. The latter gentleman, writing in 1869,* says that typical eczema is an acute inflammatory disease; in which, with more or less superficial redness, there is an eruption of closely packed vesicles that exist only for a very short while, and are often unobserved. These vesicles run together, burst, and are replaced by excoriations which pour out serum, that stiffens linen, and dries into thin yellow crusts, which are composed of blastema, pus corpuscles, epithelial cells, and granular matter. The vesicles may appear in successive crops, prolonging the disease indefinitely. Excoriations and crackings occur, the true skin may get infiltrated, and the parts around the patches will perhaps inflame. When the disease is extensive there may be sharp pyrexia; together with headache, loss of appetite, dirty tongue, &c. If the eruption becomes chronic, the skin gets harsh and dry and thickened: there is frequent oscillation between cure and relapse.

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* For a good account of this disease the reader should refer to a paper by Mr. Jonathan Hutchinson in *The Royal London Ophthalmic Hospital Reports*, vol. v. p. 191. London, 1866.

Now seeing that eczema is the commonest of all skin diseases, the fact that several gentlemen who have enjoyed more than ordinary opportunities for the study of cutaneous affections should differ in opinion as regards its elementary lesion is rather remarkable. But the explanation is probably this,—that the patient very seldom comes under observation during the early stage. The balance of evidence is in favour of there being such a vesicular rash at the outset of the disease.

There are several species of this disease. In all forms there is serous infiltration of the affected part of the skin; and this leads to exudation on the surface, the production of crusts or scabs, and the setting up of heat and itching which are aggravated by stimulants and warmth. When the eruption consists of minute vesicles on different parts of the skin, with infiltration and reddened scaly patches, it is called *eczema simplex:* when the skin is inflamed, the redness persistent, and the heat and swelling and general pyrexia well-marked, the disease is known as *eczema rubrum. Eczema impetiginodes* is a severe degree of eczema rubrum: the constitutional disturbance is great. Where the disorder arises, as it sometimes does, from great heat, especially from the heat of the sun, it is called *eczema solare;* when as a result of the use of mercury, *eczema mercuriale.* Both of these are merely forms of simple eczema. In infants at the breast, and in children during dentition, this disease—*eczema infantile*—is often very severe and obstinate. It may extend over the whole body; becoming complicated with erythema, impetigo, pityriasis, and in fact with almost every eruption that the skin seems liable to. The general health of the infant becomes much depressed.

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* *Skin Diseases: their Description, Pathology, Diagnosis, and Treatment.* Second Edition, p. 97. London, 1869. See also Third Edition, since published.

All the varieties of eczema are often obstinate, and for a time will resist the power of medicines. Mild local applications, such as thin gruel, barley water, linseed tea, lead lotion, or linen rags dipped in warm water and covered with oiled silk, are useful. Frequent bathing with warm alkaline or starchy water is very soothing. I have found the glycerine of starch, or a lotion of glycerine and water in equal parts, very beneficial in some instances; while in a few others, a small portion of a mixture of equal parts of soft (potash) soap and the officinal tar ointment, rubbed in night and morning, has answered better. The officinal lime liniment (the old carron oil) has been recommended; and so have lotions containing belladonna or corrosive sublimate, sulphur ointments, the ointment of nitrate of mercury diluted with lard, as well as the ointment of ammoniated mercury (white precipitate). The latter is very useful where there is thickening and induration of the skin. Great attention to cleanliness will be needed. The scabs ought to be thoroughly saturated with washed lard or olive oil, and then removed by linseed poultices; for as long as any crusts remain it is impossible properly to affect the diseased surfaces with local remedies. Moreover, such crusts are in themselves very irritating, while they may even set up inflammation.

The general treatment must consist in the use of warm or tepid baths, a plain diet with fresh meat and plenty of milk, and daily walking exercise. As regards medicines there may be needed saline laxatives or an occasional dose of blue pill and colocynth, slightly acidulated drinks, opiates to relieve the irritation, sarsaparilla, the mineral acids, &c. Supposing the kidneys act inefficiently, diuretics had better be prescribed; the two best agents of this class for the present purpose being simple water in large quantities, and the acid tartrate of potash (cream of tartar) very freely diluted. As regards severe or chronic cases the remedies which have proved most efficacious in my hands have been steel, quinine, arsenic, and cod liver oil. Sometimes one of the first three agents has been administered separately; but often it has appeared advisable to give them in combination (F. 381). Supposing improvement has been manifested for a few weeks, and the case should then have become stationary, benefit has resulted from substituting the corrosive sublimate with sarsaparilla (F. 27) for the tonics. Moreover, where there has been any evidence of gout in the system, colchicum (F. 46) has been employed; when rheumatism has been present, iodide of potassium and bark (F. 31), or iodide of iron (F. 32), have been trusted to; where the nervous system has appeared depressed the hypophosphite of soda or lime (F. 419) has been prescribed; while if there has appeared to be any syphilitic taint, mercurial vapour baths (F. 131) have been ordered, and the red iodide of mercury (F. 54) has been administered by the mouth. During the greater part of 1868 the widow of an eminent physician took full doses of arsenic for the cure of very obstinate eczema, and for a time with advantage. Matters then came to a stand-still, or even retrograded. Without much hope, I prescribed two tar capsules (F. 36) thrice daily; and with such astonishing benefit, that I rather sank in the patient's estimation for not having resorted to this agent at the commencement of the treatment. A complete cure seems to have resulted.

In eczema infantile the child's bowels had better be acted on by a few doses of magnesia, or of rhubarb and magnesia, or of calomel. Then care ought to be taken that the milk on which the patient is fed is pure and good. Scabs are to be removed by olive oil and bread poultices; while the local distress is to be relieved by the free application of zinc ointment, or of ointment of acetate of lead, or of a lotion of elder-flower water. Finally, the blood is to be restored to its healthy condition by the employment of the arsenical solution (one minim may be given to an infant three or four months old, thrice daily) in a little steel wine and syrup, or in chemical food (F. 405). One teaspoonful of cod liver oil, twice or thrice a day on a little sweetened orange juice, will always prove most valuable, especially during the winter months.

4. DYSIDROSIS.

This is a special disease, first described by Dr. Tilbury Fox.* It is connected with the sweat glands, and in it vesicles are formed in the first instance by distension of these sweat glands and their ducts. The disease attacks the hands chiefly, and rarely the feet. It has hitherto been confounded with eczema. "In its slightest form it is confined to the hand, occurring in the interdigits, over the palm, and along the sides of the fingers, and over their palmar surfaces—in one or all of these parts. The eruption makes its appearance in those who habitually perspire freely, and generally in the summer, but oftentimes in the winter, and the patients attacked complain of feeling weak and depressed. The eruption is made up in the first instance of minute vesicles *deeply imbedded in the skin*. The vesicles are at first isolated. They do not readily burst, and when they have existed for a few days the appearance of the part is just as though a number of small boiled sago grains were imbedded in the skin. These sago-grain-looking points are caused by distension of the sweat ducts and glands by clear sweat, whose transparency contrasts with the aspect of the follicular wall and adjacent parts. There is always much itching and burning present. As the disease progresses the vesicles become more distended and raised; they eventually became yellowish in colour, and run together into the form of aggregated clusters of bullæ. Actual bullæ of greater or less size may form. . . . After a while the fluid dries up, the cuticle peels off, leaving a *non-discharging reddened exposed derma.* Or the cuticle, especially about the roots of the fingers on the palmar aspect, may become soddened and like wet chamois leather. In some of the slighter cases the disease does not run on to the development of bullæ. In the severer and the slighter form one or both hands may be affected" (Tilbury Fox). The eruption leaves the hands very stiff and sore oftentimes. It may be complicated by a miliary rash over the body. It differs from eczema in being a disorder of the sweat glands, the vesicles being produced by their occlusion, and there is no such discharge in it as in eczema. Dr. Fox states the proper treatment to be diuretics internally, with soothing and emollient applications externally at the outset, to be followed by general tonics and mild astringents subsequently.

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* *Skin Diseases, &c.* Third Edition, 1873. Renshaw.

ORDER III. BULLÆ.

As a general rule, bullæ differ from vesiculæ merely in being larger; and hence it is almost unnecessary to separate them into two orders. Bullæ [from *Bulla* = a bubble of water] consist of variously shaped superficial tumours or blebs, caused by effusions of serum beneath the epidermis; the bladders bursting after a few days, while their contents form thickish crusts. Pemphigus and rupia are the two eruptions which are classed under the denomination of bullous diseases.

1. PEMPHIGUS.

This affection is characterized by the appearance of large round or oval bullæ or blebs, each being two or three inches in diameter, upon one or more regions of the body. Each bleb is filled with ordinary alkaline serum; which after a time loses its transparency, and then becomes acid and puriform. The eruption in pemphigus [from Πέμφιξ = a bubble or blister] is generally preceded for twenty-four or forty-eight hours by slight general indisposition, fever, and itching of the skin. Small red circular patches then form, which gradually increase in extent, and become covered with bullæ; these either fading away on attaining their full size, or bursting and being replaced by thin brownish-coloured incrustations. There may be only one bleb (P. solitarius), or a dozen or two, and the disease may run an acute course: this is very rare, usually it has all the characters of a chronic disease. The duration of this disease is commonly from one to three weeks, although it occasionally becomes unusually chronic and is prolonged for months. The subjects of it are almost always more or less debilitated. Elderly people now and then have some four or five bullæ developed about the ankles or wrists, giving evidence that they are out of health. It is important under these circumstances to examine the urine, as there is oft-times either sugar or albumen present. Moreover, I have seen a few marked cases of pemphigus in pregnant women who have been badly fed.

Pemphigus sometimes attacks infants within a short time after birth. The bullæ usually appear on the palms of the hands or the soles of the feet, or more seldom about the buttocks; and as they burst, unhealthy (perhaps sloughing or gangrenous) ulcers are often disclosed. If the disease occurs in very young infants and is limited to the soles of the feet and the palms of the hands, it is probably syphilitic. Unless these cases are promptly treated, the disorder rapidly runs on to a fatal issue. Diarrhœa and vomiting set in, the little patient quickly becomes greatly emaciated, and death occurs from exhaustion. The only remedy which has appeared to me to have any beneficial effect in pemphigus neonatorum has been a simple solution of raw meat; while it has also been found necessary to have the infant fed by a healthy wet-nurse. It has never seemed advisable to trust to the mother in these cases. Moreover, where the child has presented any indication of syphilis chlorate of potash (from two to five grains thrice daily) has been given. There is a rare form of pemphigus which begins in the front of the chest and rapidly spreads all over the body, and in which the bullæ are abortive or ill-developed, at the same time that they run together, producing a thickened crusted surface covered with flaky scales, the remains of the dried up bullæ walls, and resembling at first sight an eczema. This is called pemphigus foliaceus.

Pompholyx [from Πομφὸς = a blister] is merely a variety of pemphigus, unattended with fever, and running its course in eight or ten days: it is very rare.—A kind of artificial pompholyx may be produced by the application of cantharides. I remember a young woman in King's College Hospital who deceived all who saw her for a short time by rubbing powdered cantharides into various parts of her person, and thus raising numerous small blisters. Particles of the fly were detected with a lens.

Tonic medicines, rest from work and warm clothing, with generous diet and fresh air, appear to be the remedies called for in the management of pemphigus. Hence ammonia and bark (F. 371), nitro-hydrochloric acid and some bitter infusion (F. 378), or quinine and iron (F. 380) should be prescribed. For the aged or very weakly, cod liver oil is useful. As an aperient, if one be needed, the effervescing citrate of magnesia answers well. In any obstinate cases, arsenic with quinine and steel (F. 381) will certainly effect a cure. Most practitioners agree that it is better to puncture each blister with a fine needle, directly it has formed. Care should be taken that the cuticle is not rubbed off. There are few applications better than water dressing for any superficial ulcerations which may result.

2. RUPIA.

Rupia [from Ῥύπος = filth; in consequence of the foulness of the affected parts] may be considered as a modification of pemphigus occurring in persons of debilitated constitutions, and always in those whose systems have been contaminated with the poison of syphilis. The disease is characterized by the eruption of isolated flattened bullæ; these blebs containing at first serous fluid, which soon becomes purulent or sanguinolent. The blebs and their contents then concrete or dry into dark and black and rough scabs. The margins of the surrounding skin inflame; more serum continues to be poured out; and thus the incrustation increases in circumference and thickness until it somewhat resembles the shell of one of the mollusca. When the crusts fall off they leave circular ulcers, of various sizes, indisposed to heal, and which often only cicatrize after the lapse of many weeks; ugly red or brownish marks being left, which persist for very many months. The loins and lower extremities are most frequently affected. The duration of rupia varies from two or three weeks to several months. There is seldom any danger, unless a great deficiency of vital power be present.

Two forms of this disease are usually described. When the crusts are thin, and the ulcers beneath them superficial, we speak of *rupia simplex*. If the crust be large (from three or four to eight or nine lines in thickness), constituting the marked feature of the case, the disorder is known as *rupia prominens:* the surrounding skin puts on an erythematous blush. Where the ulceration is extensive and deep and spreading, *rupia escharotica* is a technical term employed to distinguish this coarse sub-variety. Weakly syphilitic children, especially if they are insufficiently fed and imperfectly washed and clothed, are apt to suffer from rupia escharotica; foul and ragged and painful ulcers being produced about the thighs and nates and loins, so that the already bad health deteriorates still more until perhaps even death results.

Warm baths, generous diet, wine, cod liver oil, and bark with nitric acid, or quinine with tincture of serpentary, with a full course of iodide of potassium (F. 31) will generally effect a cure. Where the system is much depressed, iodide of iron and cod liver oil had better be trusted to. The bullæ ought to be punctured early in all cases, and the sores dressed with iodide of starch paste, in the first place, and then some weak mercurial ointment.

ORDER IV. PUSTULÆ.

The pustular affections of the skin are characterized by the formation, between the cuticle and cutis vera, of small tumours or pustules containing purulent fluid. The pustules are sometimes scattered irregularly, sometimes united in clusters; they vary in their shape and degree of elevation, as well as in the size of their inflamed bases; while they are succeeded by irregularly formed scabs, and frequently by permanent cicatrices. The diseases of this class are—ecthyma and impetigo. Small-pox is often ranged with the pustular diseases.

1. ECTHYMA.

Ecthyma [from 'Εκθύω = to break out in eruptions] is a non-contagious inflammation of the skin; characterized by large and prominent pustules, with hard and inflamed bases, occurring upon any part of the body. These pustules or phlyzaciæ are usually distinct, they are seated upon a hard inflamed base, and they terminate in thick dark-coloured scabs. The latter leave superficial ulcers, followed by cicatrices. The disease may be acute; being preceded by lancinating burning pains in the limbs or other parts about to be affected, as well as by feverishness. More commonly, however, ecthyma is chronic, and is often one of the ills of poverty; resulting from the use of improper or innutritious food, from debauchery, from exposure to damp, and from residence in close rooms. In *ecthyma cachecticum* the ulcers assume an unhealthy appearance; while the general health, which was bad prior to the eruption, becomes still more deteriorated. The lower the constitutional powers, the more chronic will be the disease.

Ecthyma will frequently occur spontaneously; or it is often met with as a sequela to some other disease—as one of the eruptive fevers, syphilis, &c.; or it may result from some irritant applied to the skin, and is a common accompaniment of scabies and phthiriasis. It is easily produced by croton oil liniment, or by the ointment of tartarated antimony: the irritation caused by handling sugar gives rise to it—grocer's itch. When arising without any apparent cause, young persons appear to be most obnoxious to it, especially in the spring and summer. The eruption may be very partial, or it may almost cover the body; and it will possibly continue troublesome for many weeks, sometimes one crop after another appearing in rapid succession.

The *treatment* of the acute form must consist in the use of gentle laxatives, slightly acidulated drinks, and a nourishing diet. Water dressing, or the sub-acetate of lead lotion, or the elder-flower ointment of the London Pharmacopœia, or the zinc ointment of the last British Pharmacopœia, may be applied to the pustules.—In the chronic variety it is necessary in the first instance to get rid of scabies or phthiriasis if present. In cachectic subjects stimulants and generous living should be allowed; while the health is to be improved by cod liver oil, quinine and iron, and warm or tepid or gelatine baths. Where the disease is very chronic, a cure will be effected by combining small doses of arsenic with the ferruginous tonic.

2. IMPETIGO.

Impetigo [from *Impeto* = to attack; terminal *-igo*] is a severe purulent inflammation of the skin. It is described as pustular eczema by some writers. The disease is characterized by an eruption of small hemispheroidal or flattened pustules or psydraciæ; which are most frequently grouped in clusters, which have a tendency to run together, and which form thick and moist yellowish scabs or incrustations. From the psydraciæ, as well as from beneath the incrustations, a sero-purulent or puriform discharge takes place; while the crusts become thicker and larger, until they fall off leaving a raw surface. The mode of distribution of the pustules has caused a division of the disease into two varieties,—*impetigo figurata* and *impetigo sparsa*. The first kind occurs generally on the face, especially on the cheeks; it is attended with febrile and other constitutional disturbance, and often with swelling of the lymphatic glands; while, as the psydracious pustules (which are arranged in round or oval or irregular groups) burst and form scabs, the heat and itching become intolerable. In children, the impetiginous eruption and its yellow tenacious secretion sometimes cover the face or head like a mask, the disease being called *crusta lactea*, or *porrigo larvalis*, or *melitagra* from the honey-like appearance of the discharge: it is now and then originated by the irritation set up by the presence of the pediculus capitis. The second form of impetigo slightly differs from the first, inasmuch as the pustules are more scattered; being sometimes irregularly distributed over an entire limb, or even over the whole body. Both varieties may be looked upon as diseases almost peculiar to the poor. Amongst the lower orders the ill-fed and the scrofulous are those who chiefly suffer.

Dr. Tilbury Fox* describes a special contagious form of pustular disease, under the term impetigo contagiosa, and his observations are confirmed by Wilson, M'Call Anderson, several American dermatologists, such as Taylor, Wigglesworth, Duhring, Henry, and others, and we believe Hebra himself now admits the existence of the disease. The eruption is characterized by the development of little "watery heads," that become vesico-pustules, and give place to thin yellow crusts, that appear as if "stuck on." These spots are distinct the one from the other, are very superficial indeed, and the secretion derived from them possesses a contagious quality. The disease is sometimes accompanied by slight fever. It attacks the cleanly equally with the dirty. It is often semi-epidemic, and usually attacks several or all of the children of a family. It is rarely seen in adults. Its seat is the face, especially, but also the limbs and body.

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* *Skin Diseases.* Third Edition. Renshaw.

In the most contagious forms, when there is much inflammatory action, the patient ought to be kept very quiet, and on a light diet with a free supply of diluents. The bowels must be acted upon by saline purgatives. The best local applications are lotions containing extract of poppies, or lead, or the oxide of zinc, or hydrocyanic acid, or creasote, or glycerine: dusting the affected part with the oxide of zinc, or with the impure carbonate of zinc, occasionally relieves the irritation. Vapour or warm water baths are always beneficial. The scabs ought to be removed by poultices or water dressing, and by ointments. Creasote ointment, after the scabs have come off, is useful. The ointment of nitrate of mercury, or that of the red oxide of mercury, may also prove valuable. If the scalp or beard be involved, the hairs will have to be cut short. The constitutional treatment must consist in paying attention to the diet, forbidding stimulants but allowing plenty of milk; together with recommending the use of mild laxatives, alkalies, and tonics—especially quinine. Arsenic is sometimes required; while cod liver oil may be said to be indispensable. Contagious impetigo is cured by local remedies alone. All that is needed is to get off the scabs as they form, and apply to the surface beneath a very weak ammoniated mercury ointment.

ORDER V. PAPULÆ.

Papulæ [from *Papula* = a pimple] are small, solid, acuminated elevations of the cuticle, resembling enlarged papillæ of the skin. They generally terminate in resolution or in slight desquamation. Papular eruptions are usually preceded and attended by itching; they are rarely accompanied by fever; they are slowly formed; they are not contagious; they may be developed on any part of the body; and they are sometimes very troublesome, varying in their duration from a week to several months. Strophulus, lichen, and prurigo are the diseases of this class.

I. STROPHULUS.

This papular disease, commonly known as red gum or tooth rash, is peculiar to infants and young children. By some dermatologists, however, strophulus is regarded as lichen modified by the delicate skin of the infant. Strophulus is characterized by an eruption of minute, hard, sometimes slightly red, and clustered or scattered pimples; which may appear upon a part, or extend over the whole surface of the body. The pimples are most common on the face and neck. The irritation is slight. The affected surface may be moist, and there may be slight desquamation.

Several varieties of strophulus have been described, according as the papulæ appear to be large or small, scattered or grouped. But whether the papules are scattered, with vivid red blushes or dots, interspersed among them, as in *strophulus intertinctus;* or whether the eruption is copious and confluent, as in *strophulus confertus;* or whether the spots are white and large, often resembling fleabites, as in *strophulus candidus;* or whether the papulæ form circular patches, which come out successively in different parts of the body, as in *strophulus volaticus,*—whichever variety is present is really of little moment. For practically all forms are due to stomach or intestinal derangement; this derangement being the consequence of improper feeding, or of irritation about the gums from dentition. In infants brought up by hand, the acidity of cow's milk often produces diarrhœa and sometimes red gum. To prevent these results, and to make the milk more nearly resemble that of the human female, it ought to be rendered slightly alkaline by the addition of a few grains of carbonate of soda or of bicarbonate of potash to each pint. Even in infants who are properly nursed but who are suffering from strophulus, care should be taken to ascertain that the mother's milk is natural. Then, if there be constipation, a little rhubarb and magnesia in dill water may be given; or if there be any diarrhœa, a few doses of chalk mixture will be required. Where the eruption seems connected with dental irritation, lancing the gums often gives complete relief. If there be any troublesome itching, a little oxide of zinc ointment, or glycerine and rose water, or a dusting powder of starch or calamine, should be applied; while small doses of the syrup of iodide of iron are administered internally. In all forms attention must be paid to cleanliness; as well as to having linen next the skin instead of irritating flannel.

2. LICHEN.

Lichen [from Λειχὴν = moss] is an obstinate and annoying papular affection. It may be readily recognised by the minute and hard, dry and red elevations of the skin which it presents, and which are either distinct or arranged in clusters; by the tingling and itching that accompany the eruption; as well as by the slight desquamation which follows its fading.

According to Willan there are seven species of this eruption:—
1. *Lichen simplex,* in which there is an eruption of red inflamed papulæ, appearing on the face or arms, and extending to the trunk and legs. There is slight fever, with itching or tingling; the eruption begins to fade in about a week, when desquamation

takes place; and the disease is apt to return every spring or summer in individuals of an irritable constitution. This form is sometimes mistaken for measles or for scarlet fever.—2. *Lichen pilaris*, or hair lichen, is a modification of the preceding, the papulæ appearing only at the roots of the hairs. It is often due to stomach derangement, especially such as arises from the abuse of alcoholic drinks.—3. *Lichen circumscriptus*, or clustered lichen, is characterized by patches of papulæ which have a well-defined margin, and an irregularly circular form.—4. *Lichen agrius*, or wild lichen, is by far the most severe form, and is ushered in with fever. The papulæ are much inflamed, and are developed on an erythematous surface which appears hot and painfully distended. In a short time the inflammation diminishes, and the papulæ become covered with a furfuraceous desquamation; or their points are scratched off, the skin around them becomes fissured into deep and painful cracks, and a sero-purulent fluid exudes which dries into thin scaly crusts. The itching, tingling, and smarting are often very intense; there is usually fever, nausea, headache, rigors, and other symptoms of constitutional disturbance; while although in mild cases the symptoms may subside and the eruption die away in about fourteen days, yet in severe varieties the disease is frequently prolonged for several months. Women are said to suffer more frequently than men from this variety.—5. *Lichen lividus* is distinguished by the livid hue of its papulæ, which chiefly form on the limbs, and are not accompanied by fever. It is rather a *purpura* than a lichen.—6. *Lichen tropicus*, or prickly heat, is peculiar to tropical climates. It appears to be partly due to exposure during the heat of the day, before the system has become acclimatized, and, as pointed out by Dr. Tilbury Fox, the papulæ are formed by hyperæmia of the sweat follicles.—7. *Lichen urticatus*, or nettle lichen, is peculiar, inasmuch as its commencement is marked by the occurrence of wheals, like those which are produced by the bites of bugs or gnats. These wheals soon subside and leave papulæ, which are sometimes obstinate; both wheals and papulæ being accompanied with itching, pricking, and tingling. The disease is in fact an urticaria, followed by the formation of papulæ in the seat of the wheals.

The *treatment* of all the above forms of lichen except the fourth and fifth is, as a rule, simple; for tepid baths, mild laxatives, and unstimulating diet, and acidulous drinks will most times effect a cure. The irritation will be best relieved by a weak lotion of the liquor plumbi subacetatis, to which a little laurel water or hydrocyanic acid has been added; or by equal parts of the subacetate of lead and oxide of zinc ointments; or by a lotion consisting of one ounce of glycerine, six grains of corrosive sublimate, twenty or thirty drops of chloroform, and seven ounces of water.

In lichen agrius, however, alterative remedies will be required.

Sometimes, especially where the skin is thickened, a mixture of corrosive sublimate and bark (F. 27) acts very favourably; in other cases arsenic (F. 52) has certainly proved more useful. Occasionally I have found it advantageous, where the disease has proved very refractory, to administer arsenic, while about twice a week a mercurial vapour bath (F. 131) has been employed. The sulphur baths (F. 125, 126) are strongly and justly recommended by some authorities.

With regard to lichen lividus, it is only necessary to say that our remedies must be such as impart tone to the system. Local stimulation of the skin is unadvisable. A generous diet with a moderate allowance of Bordeaux or Hungarian or Greek wine, quinine with one of the mineral acids (F. 379), and cod liver oil are the agents to be trusted to.

But there are two other special forms of lichen recently admitted as distinct diseases by dermatologists. The first is *lichen scrofulorum,* which occurs in scrofulous subjects, characterized by papules formed by the plugging up of the follicles by epithelial débris and sebaceous matter, and distributed over various parts of the body, and cured by cod liver oil. The second is the *lichen ruber* of Hebra, and its modified form, the *lichen planus* of Wilson. Lichen ruber is very rare in England, and is an exaggerated form of lichen planus. The latter is characterized by the development of dusky-red papules, which have an angular base, a flat, shining top, and a central puncture, in recent cases plainly visible and indicating the opening of the hair follicle. These papulæ are about the size of millet seed, and are attended by much itching. They occur in the discrete form or crowd together into patches, and then their individuality is only seen at the edge of the patches, whose surfaces are covered by a few thin, whitish, transparent scales, giving the appearance in slight degree of psoriasis. These papules and patches occur especially above the wrist, on the front of the forearm, about the flank, the gluteal region, the inside of the thigh and leg, and below the knee. When the papules or patches disappear, dark stains are left behind. The patients attacked by the disease are mostly weak and otherwise out of health. The disease is obstinate, and must be treated by tonics, especially arsenic internally, and the inunction of oily matters with sedatives locally.

3. PRURIGO.

Prurigo [from *Prurio* = to itch; terminal *-igo*] is a cutaneous disease characterized by an eruption of small papulæ or pimples, which until scratched are of the natural colour of the skin, together with more or less pruritus of severe character. Under all circumstances prurigo is a chronic and a rare affection. It may last for months or years, causing great discomfort, not to say misery. The itching or pruritus is intense in most cases. Patients afflicted with it scratch and tear themselves constantly till the blood flows; their sufferings being aggravated by stimulants and warmth. Willan describes three varieties—*prurigo mitis, prurigo formicans,* and *prurigo senilis.* The first two can be regarded as prurigo. The first is the mildest form: the itching is seldom unbearable, but it becomes worse towards evening. In the second variety, the annoyance is very great, frequently preventing sleep during the early part of the night: the pricking and burning sensations are compared to the creeping of numberless ants or the stinging of insects. The third kind is in reality phthiriasis: it is caused by pediculi, occurs mostly in old persons, and is most obstinate, often continuing for the rest of the patient's life. The skin becomes rugous and somewhat thickened; while commingled with the papulæ are found patches of erythema and urticaria, small pustules, &c. The general health suffers, inasmuch as the complaint renders life miserable.

Prurigo may attack the cutaneous surface generally, or it will be found limited to certain districts. From the latter peculiarity we are in the habit of speaking of prurigo scroti, p. pubis, p. podicis when the skin round the anus is attacked, and p. pudendi when the parts around the female vulva and perineum are affected. But these are instances of pruritus attended by papulation and excoriation, induced by scratching to relieve the pruritus.

In attempting the cure of prurigo, hot alkaline (F. 121), sulphur (F. 125), conium (F. 122), creasote (F. 123), or even plain water baths, should be used daily. The Turkish bath, where there is no disease of the heart or large bloodvessels, can often be taken twice or thrice a week with great benefit. The local applications which give the most relief are vinegar, lime water, tobacco water (F. 265), a weak solution of corrosive sublimate, a dilute solution of carbolic acid, a lotion containing prussic acid or laurel water, an ointment prepared with a small quantity of aconitine, tar ointment, &c. The less the patient scratches himself the better. If thread worms infest the bowel, they must be thoroughly expelled: if there be uterine disease, all remedies will fail till this be cured.

The general treatment must consist in the use of a light and cooling regimen; the avoidance of stimulating food or drinks; and the employment of laxatives with tonics (F. 148, 153, 165). Where the kidneys do not act efficiently large doses of acetate of potash, freely diluted, are indicated. Then the practitioner can select, according to circumstances, either sarsaparilla and iodide of iron (F. 32), tar in pills or capsules (F. 36), acid tonics with taraxacum (F. 376, 377, 378), or even arsenic in full doses (F. 52, 399). Occasionally, small doses of strychnia with cod liver oil prove very serviceable.

With the object of affording temporary relief to the irritation recourse must oft-times be had to the internal administration of sedatives. Of the various drugs belonging to this class there is not one that can be especially recommended. Perhaps the best is belladonna; about fifteen minims of the tincture in two fluid drachms of syrup of poppies now and then sufficing to give a good night's rest. In other cases, full doses of hyoscyamus answer well. Opium acts like a charm in some instances, and greatly aggravates the annoyance in others. Morphia is usually injurious; but if tried, it is best to use it subcutaneously with a minute dose of atropine (F. 315). Aconite, conium, digitalis, and stramonium are very uncertain in their action.

ORDER VI. SQUAMÆ.

The term Squamæ [from *Squama* = a scale] is applied to the scales of degenerated, thickened, dry epidermis which cover minute papular elevations of the skin; these scales or particles of scurf being readily detached, though they are reproduced by successive desquamations for a long time. The scales or scurf are the result of a morbid secretion of the epidermis. Their formation gives rise to but slight constitutional disturbance, and to mere local heat and itching; while none of the squamous diseases are contagious, though they are very chronic in their duration. Psoriasis (including lepra), pityriasis, and ichthyosis are the disorders which range under this division.

1. PSORIASIS.

Psoriasis [from Ψώρα = tetter], psora leprosa, alphos, or dry tetter, is a chronic non-contagious inflammation of the derma. It is characterized by the development of dry and indistinctly copper-coloured patches of various extent and form, which are slightly raised above the level of the skin; these patches being covered by thin and adhesive and whitish or silvery scales of altered epiderma, and being accompanied by rhagades or fissures (with an insignificant thickening) of the skin. Whether there are distinct varieties of psoriasis, or whether what are so termed are merely different stages of the same disease (as Dr. M'Call Anderson's writings have led me to believe) is not of much consequence. Suffice it, that as forms or stages of this disorder we have to recognise psoriasis vulgaris, p. guttata, p. diffusa, p. gyrata, and p. inveterata. The cutaneous eruption which has long been known as *Lepra* [Λέπρα = a scaly state of the skin] is now allowed to be merely a variety or a declining stage of psoriasis, and not a separate affection. As a rule, the general health is not appreciably affected in psoriasis; there being few if any symptoms beyond slight itching, and the sense of annoyance which results from having "a skin disease."

Psoriasis vulgaris (the lepra vulgaris of Willan, the alphos circinatus of Erasmus Wilson) is the most common form of this disorder. The dry silvery scales formed of epithelium, situated on tawny-red patches of skin, are at first very small, though they sometimes increase rather quickly in size. They are most often seen about the elbows and knees. The disease next appears upon the back, the chest, the inside of the thighs, &c., but rarely on the face. *Psoriasis guttata* is peculiar, inasmuch as the scattered patches are said to give an appearance to the skin as if it had been splashed with mortar. The patches are mostly seen on the trunk, and next on the limbs. *Psoriasis diffusa* is merely remarkable for the great extent of the patches; these not uncommonly covering an entire limb, or even a great portion of the cutaneous surface. This diffusion is not only due to the spreading of the disease by its gradual encroachment on healthy tissue, but also to the recurring development of new spots. In *psoriasis gyrata* (alphos gyratus, lepra gyrata, &c.) the eruption takes a serpentine form, owing to the irregular commingling of the circles of the rash. Lastly, *psoriasis inveterata* (lepra inveterata, &c.) is that form in which the disease is chronic, the scales are thick and large and cracked, and the subjacent skin is red and hot and tender. There may even be a more or less copious serous exudation, causing the scales to become prominent scabs. It is this form which is described by Dr. M'Call Anderson as "psoriasis rupioides;" the large conical crusts marked by concentric rings resembling the scabs of rupia. There is, however, no connexion between psoriasis rupioides and rupia except in the shape of the scabs; for on removing them in the former no ulceration is found, but only a dusky-red and slightly weeping surface; and Dr. Tilbury Fox* has pointed out that there is a tendency to pus formation in this form, for pus can be detected oftentimes in goodly amount in the slight discharge from the weeping surface, and even in the semiconical crusts, and he is confirmed in this observation by Dr. Taylor, of New York. Dr. Fox holds psoriasis rupioides to be psoriasis in a pyogenic or strumous subject, and as specially needing cod liver oil in aid of its cure.

Looking at the different phases of psoriasis as combined in one affection, the following points may be noticed:—The elbows and knees are the favourite sites of this disease, although every part of the body, including the head, may suffer: even the nails are at times invaded. Psoriasis confined to the palms of the hands or the soles of the feet is probably invariably of syphilitic origin. Psoriasis is a chronic affection: relapses are common, a permanent cure being an exceptional occurrence. Psoriasis is often hereditary. The causes usually assigned—stomach derangements, chlorosis, tuberculosis, rickets, pregnancy, lactation, change of life, amenorrhœa, &c., probably have no influence in exciting psoriasis. Yet where a predisposition to the disease exists, whatever lowers the tone of the system may suffice to call it out. In syphilitic psoriasis the general health is usually bad; while other traces of the poison—sore throat, distinctly copper-coloured patches of erythema, nodes, &c., will probably be present.

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* *Skin Diseases: their Description, Pathology, Diagnosis, Treatment, &c.* Third Edition. Renshaw. 1874.

Were I asked to mention briefly the remedies for psoriasis, in the order of their efficiency, I should reply—arsenic, cod liver oil, and the local application of tar (the officinal unguentum picis liquidæ). Usually, it is better to employ all three simultaneously. Doubtless there are very many cases where these, like all other remedies, fail. The practitioner may then, if it so please him, ring the changes with quinine, iron, phosphorus, the hypophosphite of lime or soda, tar capsules, cantharides, colchicum, iodide of potassium, &c. In syphilitic psoriasis, however, arsenic proves useless; in such, a cure can only be wrought by mercury in some form or other, and notably by the mercurial vapour bath (F. 131). The local application of the iodine liniment is often very serviceable; and so is the use of the solid nitrate of silver. Also the iodine ointment. Where patches of syphilitic and non-syphilitic psoriasis are found to coexist, the triple compound of iodine and arsenic and mercury, known as Donovan's solution (F. 51), can be cautiously given with the prospect of great benefit.

During an arsenical course (F. 52) all acidulated drinks, fruits, and most vegetables had better be abstained from. Moreover, the dose of arsenic should not be too large. I have so frequently found the liquor arsenicalis in five minim doses quickly disagree, that I generally prescribe only three minims, thrice daily, upon a full stomach; increasing this quantity after a few weeks, if there be evidence that the metal is well borne by the stomach and system generally. When, however, the edges of the eyelids become sore and irritable, when there is any sense of nausea or any tendency to fainting, and when the silvery coat upon the tongue which results from the use of arsenic becomes well marked, the dose should be diminished. Moreover, under such circumstances it will be as well for the patient to be seen every four or five days.

2. PITYRIASIS.

Pityriasis [from Πίτυρον = bran], or dandriff, or branny tetter, is a superficial and chronic inflammation of the skin, attended with redness and itching, and characterized by the production of minute white scales or scurf in great quantity. It may attack any region; but the scalp and parts covered with hair are the most common seats of it (*Pityriasis capitis*). The desquamation takes place copiously and incessantly. This affection is often very rebellious to treatment, and may be prolonged for several months; in which case it gives rise to much annoyance, with slight constitutional disturbance. The disease may attack the entire surface, beginning in red and rough patches, in ten days or so invading the entire body, with chronic and deep inflammation of the true skin, and a profuse exfoliation of fine epidermic cells. This form is known as *pityriasis rubra.* Sometimes the exfoliation of the epidermis is so excessive that the branny particles or laminæ of cuticle cast off in every twenty-four hours may be sufficient to fill a pint or more. It is rarely met with. It lasts for years, gradually spreading over the whole body. Although at first there may be little or no constitutional derangement, yet ultimately it causes great weakness.

Some tonic infusion, an occasional purgative, and the use of sedative or alkaline lotions to the affected part, are the measures usually relied upon. In obstinate cases, however, arsenic (F. 52) has appeared to me to be the only remedy to be depended on. Occasionally the nitrate of mercury ointment, or the ointment of ammoniated mercury, does much good, applied two or three times a week. Glycerine is an excellent local palliative. When the head is the part affected, the hair should be cut off close to the scalp, with a pair of scissors. Great cleanliness is, of course, essential. The diet ought to be nourishing, with plenty of milk; stimulants being forbidden unless they are required to aid digestion.

Dr. Tilbury Fox says that in the early stage of pityriasis rubra packing in oil, the use of diuretics to relieve the skin hyperæmia, to be followed presently by the exhibition of full doses of perchloride of iron, have in his hands cured most cases—a real triumph in therapeutics if, as there seems no doubt, true.

3. ICHTHYOSIS.

Ichthyosis [from Ἰχθὺς = a fish], or the fish-skin disease, is characterized by the development, upon one or more parts of the integuments, of thick and hard, dry and imbricated scales of a dirty grey colour; these scales resting upon an uninflamed surface. The eruption is unattended by heat, pain, or itching. The scales, or shagreen-like flakes, when shed have sometimes been found to measure three-quarters of an inch in diameter. Ichthyosis is said to be a congenital disease, and to last during life. Examples of it are very seldom met with.

Simple warm and alkaline baths, or vapour baths, may be employed as palliatives; but no other treatment seems to be of any use, except the free inunction of oil to keep the skin supple and soft.

ORDER VII. TUBERCULA.

The diseases belonging to the order Tubercula [from *Tuberculum* = a little protuberance], are elephantiasis Arabum, molluscum, acne, frambœsia, keloid, and vitiligo. They are all characterized by the formation of small hard tumours or tubercles; which are more or less prominent, circumscribed in form, and persistent. The tumours may become ulcerated at the summit, or they will perhaps terminate in suppuration. Tubercular diseases are slowly developed, and are very chronic; the most formidable are peculiar to tropical regions; and the symptoms of all are so characteristic that their diagnosis is free from any difficulty.

1. ELEPHANTIASIS ARABUM.

This disease is in no way connected with that terrible and dangerous constitutional affection known as *True Leprosy*, or the *Eastern Leprosy*, or *Elephantiasis Græcorum* (vol. i. p. 115).

Elephantiasis Arabum, or elephas, or Barbadoes leg, or bucnemia tropica, or boucnemia, is characterized by great swelling and induration of the true skin or derma, producing marked deformity. The subjacent connective and adipose tissues are also implicated, being greatly hypertrophied and infiltrated with a homogeneous morbid secretion; while as the result of intermittent attacks of lymphangeitis the lymphatic vessels are found obliterated. The disease may be not improperly compared to an aggravated and permanent form of phlegmasia dolens. Boucnemia may affect the face and neck, or the arms, or the pudendum, or the scrotum. Most frequently, however, it attacks the lower extremities, commencing about the feet and ankles. It causes swelling so great that the limb becomes double its natural size. There is also hardness, and a brawn-like thickening of the integument; so that the latter in its hypertrophied state almost conceals the foot, giving rise to an appearance resembling the leg of an elephant, whence the disease has derived its name [Ἐλέφας = the elephant]. There is a tendency to erysipelas and other unhealthy forms of inflammation in this affection. It is rarely met with in Europe, occurring principally in the West Indies, China, Africa, &c. Elephantiasis generally continues for life; it ultimately causes alarming constitutional disturbance; it is neither contagious nor hereditary; and it attacks males and females, rich and poor, indiscriminately.

The treatment of boucnemia has attracted much attention of late years. Formerly, when the disease was confined to one foot and leg, amputation of the limb was resorted to with considerable success. Milder measures, however, are now found to be efficacious. Complete rest, with elevation of the limb and compression by bandages having failed, surgeons were led to try the effect of obliterating the main artery of the limb. This has been accomplished sometimes by the ligature, sometimes by pressure. The rationale of this operation is not very clear. Probably, however, it acts by temporarily cutting off the supply of nutrient fluid to the diseased structures. Directly this is accomplished, these structures begin to degenerate: while with such degeneration, the process of absorption goes on very quickly. For just as we know that absorption of the living elements of a healthy tissue is an impossibility, so the further a morbid structure is removed from a condition of health, the more efficient and speedy may be the action of the absorbents in getting rid of it. As this explanation will probably be deemed inconclusive, it is fortunate that we can fall back upon the results of the proceeding and assert that they appear to be generally favourable.

The main artery of the limb has now been tied in boucnemia on several occasions, and with good results.

With regard to the treatment of this disease by compression some success has also been obtained. Thus, in the case of a girl 21 years of age, who had suffered from elephas of the right leg for seven years, while the disease was increasing, a cure was effected by digital compression of the femoral. This compression was used for five days, and on some days for as long as twelve hours. Three years after the treatment, the affected limb was the smaller of the two. The history is reported by Dr. Vanzetti of Padua. In a second instance, at the Royal Free Hospital, in a patient under Dr. Cockle and Mr. Hill, the cure of a case of fourteen years' duration seems to have been accomplished by pressure in combination with bandaging. The femoral artery was compressed, at Scarpa's triangle, by means of the horseshoe tourniquet (at first for a short time, and then permanently), but never to the extent of completely arresting the circulation through the artery. Simultaneously, the limb was, at first, encased in a starched bandage: later, three simple rollers were used. The reduction of size, when the compression of the artery was permanent, proceeded nearly as rapidly as in cases in which the main trunk had been tied.

Elephas of the genital organs is not uncommonly seen in various parts of India; the natives of Bengal appearing to be especially liable to disease of this kind, though the other residents do not altogether escape its influence. According to Dr. Allan Webb, there are two varieties of elephas; one being due to a peculiar intermitting fever, while the other is the result of the syphilitic poison. Hence, there is simple elephas, invading the scrotum in men and the vaginal labia in women; while there is likewise the venereal form, commencing in the prepuce in the male subject and in the nymphæ with the female.

Dr. Fayrer, of the Medical College Hospital at Calcutta, whose experience in this disease is very large, while of course believing that these growths are the local expression of a constitutional disorder, says that they consist of exaggerations of the natural structures—white and yellow fibre, unstriped muscle of the dartos, skin and areolar tissue—the whole being infiltrated with a quantity of jelly-like albumino-serous fluid. They are concurrent in their growth with repeated paroxysms of periodical fever; which fever recurs in some cases once, in others twice, a month. During these attacks, the tumour is always described as increasing in size; becoming hot, turgid, painful, and sometimes fissured. It may also exude a sanious fluid. With the cessation of fever, there is a cessation in growth; but each attack leaves the morbid mass somewhat larger than it found it. The fever having entirely disappeared, the tumour either ceases to grow at all, or it increases slowly and insidiously. The scrotal hypertrophy is occasionally accompanied by elephas in other parts of the body, or of the limbs. But in the majority of cases that have come under Dr. Fayrer's observation, the disease has been confined to the genital organs. There also appears to be a tendency to fatty degeneration of the heart in these cases.

The size which these scrotal tumours may attain is most remarkable. Mr. Liston removed one which weighed nearly 50 lbs. and the patient did well. Mr. Aston Key extirpated one weighing 57 lbs., but the patient died. To within a short period Dr. Fayrer had operated on twenty-eight cases, with only six deaths (five from pyæmia, and one from exhaustion). In all the genital organs were not excised. The lightest tumour weighed 5 oz.; the heaviest nearly 76 lbs. after the blood and serum had drained from it.

2. MOLLUSCUM.

This affection derives its name from the similarity of the tubercles characteristic of it to the eminences growing on the bark of the maple tree. Molluscum consists of one or more small tumours; these varying in size from that of a pea to that of a pigeon's egg, being occasionally of a brown colour, while sometimes they are found growing from a broad base and sometimes from a narrow peduncle. There are two forms: one is contagious, the other not. In non-contagious or false molluscum, the tumours are formed of fibro-areolar tissue; and may be treated as polypi are treated in other situations, viz., by removal with the scissors or scapel.

True or contagious molluscum is a rare affection. It consists of a kind of hypertrophy of a sebaceous gland, with an accumulation of sebaceous fatty matter. Whether the disease is really contagious has been doubted, but the frequency with which the affection is found simultaneously on the face of a suckling child and the breast of the nurse, seems to be conclusive on this point. A cure of these growths can only be effected by incising them, squeezing out their contents, and applying the nitrate of silver to their walls.

3. ACNE.

Acne [perhaps a corruption of ’Ακμαὶ = pimples on the face at the age of puberty; or, according to some writers, from ’Α =

priv. + κνέω = to itch, because there is an absence of irritation], or gutta rosacea, or copper-nose, is a chronic pustular affection; characterized by the presence of small isolated pustules, with deep red bases. These pustules, after suppurating and bursting, leave behind them minute hard red tumours, the seat of which appears to be the sebaceous follicles of the skin.

Willan describes three varieties of this disease—acne simplex, acne indurata, and acne rosacea; the characteristic distinctions of which are indicated by their names. Acne simplex and acne indurata are most common about the period of puberty, they appear on the forehead or sides of the cheeks, they are very protracted in their duration, and they frequently leave indelible cicatrices. Acne rosacea attacks the nose, is often connected with some stomach or liver disease, and is mostly seen in persons of advanced years—especially if they have been bons vivants, &c. In the treatment of either of these forms, the diet must be restricted, stimulants of all kinds abstained from, and mild laxatives occasionally employed. Pepsine and other remedies to remove dyspepsia will aid the treatment. Arsenic (F. 52) is the only remedy which I have found of any service in obstinate cases. The uterine functions ought to be attended to in women. The iodide of sulphur ointment sometimes does good in acne indurata; and so does warm bathing. Hot water douches are also serviceable. A good lotion can be made with four grains of corrosive sublimate to eight ounces of the officinal almond mixture. Where the spots are small, the acid nitrate of mercury applied with a pipette can be recommended; care being taken only to touch the apex of the little swelling. Any excess of acid should be at once removed with blotting paper.

The acne punctata described by some authors seems really to consist of little black dots about the nose and chin, &c.; these dots being formed by the retention of sebaceous matter, with the presence of the acarus folliculorum or pimple mite. If from their excess these blacks specks are unsightly, they can often be removed by rubbing them with a little calomel on several occasions.

4. FRAMBŒSIA.

Frambœsia [from *Framboise* = a raspberry], or pian, or yaws, is a disorder rarely met with in Europe. It is, however, common in Africa, in parts of America, and in the West Indies. Without any precursory symptoms, portions of the skin (especially about the face, scalp, axillæ, or genital organs) are found covered with small dusky-red spots, which gradually become converted into larger tubercles; these tubercles being isolated at their summits but collected together at their bases, and often resembling raspberries or mulberries in their colour and form. The tubercles are generally hard, covered with dry scales, and are sometimes inflamed. If the inflammation spreads, ulceration soon sets in; a yellow sanious discharge resulting, which forms scabs around the tumours. The disease continues for years, or even for life.

5. KELOID.

Keloid [according to some authorities from Κήλη=a tumour + εἶδος=like], kelis, cheloidea, or cancroide, was first described by Alibert under the above names; owing to the disease presenting a flattish raised patch of integument resembling the shell of a tortoise [Χέλυς=a tortoise; terminal *-ides*]. This affection consists of small and nearly flat, tender, and cicatricial-looking excrescences; they often arise in cicatrices and are probably formed by a hypertrophy of the fibrous layer of the derma. The excrescences are one or more inches in diameter, are raised a few lines above the level of the skin, and have irregular forms with slight depressions in their centres, while they are covered with wrinkled epidermis. Sometimes the excrescence resembles a cicatrix left by a burn; which, though soft and velvety on the surface, communicates a sense of density and resistance on pressure. There may be only one tumour, but occasionally there are several. The disease is developed slowly; it rarely ends in ulceration, and sometimes disappears spontaneously merely leaving a cicatrix. Keloid is usually found on the chest between the mammæ, and is very uncommon. It has no analogy with cancer. Arsenic (F. 52) seems to be the only remedy which exerts any beneficial effect upon it. Pressure has been recommended, but it will probably prove worse than useless if tried.

6. VITILIGO.

This is a rare disease which received its name from Willan, owing to his belief that it produced a glistening veal-like appearance of the skin [from *Vitulus* = a calf; terminal *-igo*]. It is characterized by the formation of "smooth, white, shining tubercles, which rise on the skin, sometimes in particular parts, as about the ears, neck, and face; and sometimes over nearly the whole body, intermixed with shining papulæ. They vary much in their course and progress: in some cases they reach their full size in the space of a week (attaining the magnitude of a large wart), and then begin to subside, becoming flattened to the level of the cuticle in about ten days: in other instances, they advance less rapidly, and the elevation which they acquire is less considerable; in fact they are less distinctly tubercular. But in these cases they are more permanent; and as they gradually subside to the level of the surface, they creep along in one direction, as, for example, across the face or along the limbs, chequering the whole superfices with a veal-skin appearance."* The eruption destroys the hairs in its progress : it never advances to ulceration.

Drs. Addison and Gull speak of two varieties,—the *vitiligoidea plana* and *v. tuberosa,* which may occur separately or combined. In the former, irregular yellow patches are observed, slightly elevated and hard : in the latter, there are isolated or confluent tubercles, ranging from the size of a pin's head to that of a large pea. Vitiligoidea (described by Mr. Erasmus Wilson under the name of Xanthelasma) is most frequently seen in the shape of yellowish patches, symmetrically arranged about the eyelids and their vicinity. In some of the cases which have been treated at Guy's Hospital there has appeared to be some connexion between this skin disease and derangement of the liver. So again, out of five instances observed by Hebra there happened to be jaundice in three.

ORDER VIII. PARASITICI.

The order Parasitici must be divided into two groups—the dermatophyta and the dermatozoa; according as the parasite belongs to the vegetable or the animal kingdom. The cutaneous affections depending upon parasitic plants, or epiphytes, are Tinea† tonsurans, Tinea kerion, Tinea favosa, Tinea decalvans, Tinea sycosis, and Tinea versicolor or Chloasma. Of the diseases produced by animal parasites, or epizoa, Scabies and Phthiriasis are the important ones. All these affections are contagious.

The fact is now generally admitted that both animals and plants are liable to suffer from diseases induced by parasitic fungi —plants of the lowest type. Some of the plants of this class are familiar to everyone; as, for example, yeast, mildew, rust, smut, mushrooms, toadstools, &c. The more minute fungi which find a suitable soil on animal bodies have only been discovered of late years. In all fungi there are delicate transparent filaments, representative of the root fibres of higher plants. These filaments or threads are known as "mycelium." If by excessive multiplication with repeated forking the filaments get matted together, they are spoken of as "thallus." The fruits of fungi are termed "spores" (sporidia, or sporules); and these round or oval, solitary or collected bodies, consist of granules floating in a fluid, enclosed in a case of cellulose. The spores may be carried by the air from one subject to another; though most frequently they are distributed by actual contact between the bearer and a healthy individual. Parasitic diseases are thus sometimes transmitted from animals to man. Dr. Tilbury Fox, who is one of our first authorities on all these questions, says that mice with favus can communicate the disease to the cat; while this animal subsequently gives favus, or even body ringworm, to the human subject. Certainly, favus is not an uncommon disease of mice and cats, as well as of horses and oxen and calves; so that consequently there is every reason for regarding Dr. Fox's views as correct so far as concerns the communication of favus from the cat to man. With regard, however, to contact with an animal with favus giving rise to ringworm in the human subject there is room for a difference of opinion. As far as my own experience goes, I am no more inclined to think that tinea favosa can produce tinea tonsurans, than that the acarus folliculorum (or pimple mite) can give rise to scabies.

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* *A Practical Synopsis of Cutaneous Diseases,* by Thomas Bateman, M.D. Seventh Edition, edited by Dr. Anthony Todd Thomson, p. 834. London, 1829.

† This term [from *Tinea* = any gnawing or destructive worm] may be applied generally to all those cutaneous diseases which are due to the presence of vegetable growths. Hebra, of Vienna, believes that all the forms of tinea are produced by the same parasite : the different appearances produced by it depending upon the stage of development of the fungus, the exact nature of the soil on which it is implanted, &c. According to Dr. Tilbury Fox the fungi found on man are of "one and the same stock." On the contrary, this opinion is not that generally entertained.

1. TINEA TONSURANS.

This is a chronic contagious disease, which is far from uncommon. It is recognised by the thickened and whitened, the brittle and broken condition of the affected hairs [whence the name from *Tondeo* = to shave]; as well as by the furfuraceous or branny eruption, and the roundness of the diseased patches. It is called porrigo scutulata, or scalled head, by Bateman and Willan; herpes tonsurans by Hebra; herpes circinatus by Erichsen; trichosis furfuracea by Erasmus Wilson; and vulgarly ringworm. The parasite is the *Tricophyton tonsurans;* the sporules (about $\frac{1}{7000}$ of an inch in diameter) and mycelium of which infiltrate the texture of each hair, while they also spread among the epithelial scales.

Ringworm occurs not only on the scalp but upon other parts of the body, as the neck, trunk, &c. In children it affects the scalp: in young adults it attacks the general surface. It is a local disease just as scabies is. In ringworm of the head, or tinea tonsurans, there is at first an erythematous or else a vesicular eruption (rarely a papular or pustular rash), attended with moderate itching. Then the fungus is seen as a white or greyish powder, while the affected patch is slightly raised. The disease causes the hairs to break off almost close to the scalp; so that one or more somewhat circular patches are seen where the hairs look as if they had been cut short, and where small scales of dry epithelium are found. Moreover, the hairs just around the part appear dry and dirty. The hair-follicles seldom become obliterated in this disease, and consequently permanent baldness need not be feared. The treatment will be described in the section on sycosis.

Ringworm of the body, or tinea circinata, consists of circular and slightly raised patches, which take on furfuraceous desquamation. They are situated about the face, or neck, or breast, or shoulders, or arms. Their margins are more distinctly vesicular or papular than their central portions. The disease spreads at the circumference; while as the parasite is sometimes destroyed by the inflammatory process which it sets up, rings are seen enclosing portions of skin which have become healthy. Tinea tonsurans and tinea circinata often coexist. The parasite is the same in both instances.

2. TINEA KERION

Is tinea tonsurans in which each individual hair follicle becomes prominent, being itself inflamed, and giving out a glairy viscid fluid like mistletoe juice. The aggregation of these inflamed follicles gives the appearance of a boggy quasi inflammatory raised patch perforated by a number of foramina from whence issues a discharge.

3. TINEA FAVOSA.

This parasitic disease is seldom met with. It most commonly affects the scalp (Favus pilaris); whence, by scratching, it is apt to involve the nails (F. unguium). Body favus (F. epidermidis) is a very rare form. Favus as seen on the scalp, when the hair follicles are attacked, is found in the form of small cup-shaped and yellow crusts; each crust containing a hair in its centre, and somewhat resembling a piece of honeycomb [*Favus* = a honeycomb]. There is rather troublesome itching; the hairs become brittle, and ultimately fall out; while the crusts have a mouldy offensive odour, they are often surrounded with lice, and they are usually small unless they coalesce so as to form a large dry mass. The entire scalp may become affected if proper remedies are not used. This disease occurs mostly in children and especially in strumous subjects; while according to Hebra it is due to dirt and neglect in cleaning and combing the hair. In cases of long standing, the disease will be found on parts of the trunk as well as on the scalp, inoculation with the spores having taken place. It may produce permanent baldness by destroying the hair follicles. The synonyms for this contagious disease are honeycomb ringworm, scall-head, favus, tinea lupinosa, and porrigo favosa. The cryptogamic parasite causing it is the *Achorion Schönleinii*; the sporules of which are round or oval, and about the $\frac{1}{3000}$ of an inch in diameter. There are also smaller tubes, with much granular material. This parasite appears to find its most suitable soil in the tissues of scrofulous, or of debilitated and neglected children.

4. TINEA DECALVANS.

The fourth variety of these diseases is easily diagnosed. The hair falls off one or more circular or oval spots; leaving perfectly smooth bald patches which vary in size, being sometimes no larger than a pin's head and sometimes extending over the entire scalp [*Decalvo* = to make bald]. Frequently the affected patches look as clean and polished as the surface of a white billiard-ball. The baldness is seldom permanent. I entertain no doubt whatever but that it is contagious, though less so than the other varieties of tinea. Almost always occurring on the scalp, yet in rare cases this disease spreads and destroys every hair upon the body, thus inducing considerable deformity. This affection is usually known as porrigo decalvans, or alopecia circumscripta, or alopecia areata. The parasitic fungus is the *Microsporon Audouini*, the sporules of which are round, and much smaller than those of the fungi previously described.

5. TINEA SYCOSIS.

The fifth species of tinea is characterized by spots of erythematous inflammation which involve the hair-follicles, causing successive eruptions of small acuminated pustules. These pustules have been fancifully thought to have a granulated appearance resembling the substance of a fig [Συκόομαι = to become like a fig]. Sycosis, or ringworm of the beard, is met with most frequently upon the chin and other parts occupied by beard: it seldom occurs on the scalp, and rarely affects women. In some cases it is at least aggravated by the excessive use of alcoholic liquors. It is called mentagra by Willan and Bateman, and sycosis by Cazenave. On extracting a hair it will be seen covered with a whitish powder—the parasitic matter. This is the *Microsporon mentagrophytes*, which is probably identical with the Tricophyton tonsurans.

Treatment.—This is the same in all these varieties of tinea. It consists in constant attention to cleanliness; separation of all scabs or incrustations by the application of oil and simple ointments and poultices; removal of the brittle hairs with the scissors, or careful extraction of them by the forceps (epilation); improvement of the general health by a generous diet, cod liver oil, and bark or steel; and especially by the destruction of the parasitic plant. By the latter proceeding, the disease will in all cases be cured. It may often be effected by the application of the undiluted sulphurous acid, or of this acid with water as a lotion (F. 272); or by creasote or carbolic acid (F. 270), or by the officinal glycerine of carbolic acid; or especially by a lotion of corrosive sublimate (F. 271). Sometimes ointments appear to succeed better as parasiticides than lotions. A mixture of equal parts of calomel, creasote, and sulphur ointment is useful; or the nitrate of mercury ointment may be tried; or the corrosive sublimate ointment (F. 299), or the ammoniated mercury and sulphur ointment (F. 300), or the iodide of sulphur (F. 310), can be recommended. In ringworm the strong acetic acid is a good application, so is the officinal liniment of turpentine and acetic acid, and so is the glacial acetic acid provided the part be washed directly after its use with cold water; while there will seldom be any necessity for using these acids more than once, supposing the one selected be efficiently rubbed in, and that a small quantity of a pomatum containing some corrosive sublimate (F. 299) be employed for three or four weeks afterwards. Sometimes I have successfully painted the affected patch with a mixture of one hundred grains of iodine in an ounce of the oil of petroleum; by which a scab is formed that does not separate for a week at least. Two or three applications, at intervals of fourteen days, usually suffice. In advanced tinea decalvans good results are obtained from rubbing (or better still from brushing with a hard toothbrush) the glycerine of carbolic acid into the bald patches and surrounding parts twice or thrice a week; occasionally omitting this remedy and substituting a painting with good blistering liquid—the officinal liquor epispasticus.

Finally, in examining and treating all the forms of tinea the practitioner should remember that by chance he may inoculate himself. Such an accident has happened; and it must, to say the least, have been very disagreeable.

6. TINEA VERSICOLOR.

This affection, commonly known as chloasma [from Χλοάζω = to be of a greenish yellow colour], makes its appearance generally on the front of the chest or abdomen in the form of small patches of a dull reddish colour, which gradually increase in size, and assume a yellow tint. The eruption is often mistaken for a syphilitic stain. Chloasma merely causes a little itching: there is desquamation of small scales like fine bits of bran. Each patch gradually spreads. The disease may last from a few days to many months or years. It is contagious. Want of cleanliness, and the wearing of dirty flannel shirts, seem to favour the occurrence of chloasma by forming a fit soil for the parasite. This, according to Eichstedt, is a cryptogamic plant—the *Microsporon furfur*; the spores of which (about the $\frac{1}{4000}$ of an inch in diameter) can be detected in the branny scales by submitting them to a microscopic examination. The fungus may be completely destroyed by the use of the sulphurous acid lotion (F. 272); or by the glycerine of carbolic acid; or by the liniment of turpentine; or by a liniment of corrosive sublimate in water (F. 271), which ought to be rubbed all over the affected part every night and morning. Mr. Startin considers that it is apt to return, if an arsenical course be omitted; and hence in obstinate cases this remedy may be resorted to (F. 52). I have, however, cured a large number of cases by the mercurial liniment alone, continuing its use for a short time after the disappearance of the eruption. It is scarcely necessary to add that the skin must be kept thoroughly clean; while the dirty habit of sleeping in a flannel waistcoat ought to be abandoned, or at all events the one worn during the day should be changed at night.

7. SCABIES.

Scabies [from *Scabo* = to scratch], or the itch, is a troublesome disease produced by the burrowing of the acarus in the skin, and attended with great itching; the irritation being increased by heat, so that it is often rendered intolerable at night by a warm bed. Scabies consists of the acarus in its burrow with in addition, the results of irritation and scratching. These results of irritation being papular, vesicular, or even pustular, according to the state of health of the patients; the vesicles or pustules becoming ruptured, and excoriations being produced, by the scratching with the nails which is being constantly resorted to. This affection attacks most frequently the front of the forearm, the abdomen, the inside of the thighs, and the inter digits, where the acarus chiefly burrows. It is often stated that scabies is never seen on the face; but this opinion is probably incorrect.

The cause of the disease is an animal parasite called the *Acarus scabiei*, or *Sarcoptes hominis*. The young or larval acarus has only six legs, four in front and two behind; while the full-grown insect has eight limbs—four hind legs as well as four in front. The acarus can just be distinguished with the naked eye: a one-inch object glass shows it well. The female is considerably larger than the male; and they copulate upon the skin. After impregnation the female burrows beneath the epidermis, forming furrows or cuniculi, in which her very small eggs are usually deposited at the rate of one a day. Her life has a duration of about three months. The males do not make these galleries, but wander over the surface of the epidermis. The furrow produced by the female can be recognised as a faint white streak, leading from the papule or vesicle.

Sulphur affects a cure by destroying the acarus. Hence, after thoroughly washing the affected parts with hot water and soft soap, the sulphur ointment is to be freely applied. In private practice a soothing but efficacious liniment of equal parts of prepared storax and almond oil may be advantageously substituted for the sulphur ointment. Where this loathsome disease is extensive, sulphur baths (F. 125) prove useful. The patient had better sleep without a shirt between sheets well dusted with the flowers of sulphur (sulphur sublimatum). The contaminated clothes should generally be destroyed; or if it is desirable to keep them they must be purified by exposure to a temperature above 180° Fahr. (this can be done by putting them into hot water, or into an oven, or simply by ironing them with a hot iron), or they may be well fumigated with sulphurous acid gas. This gas can readily be procured by igniting a rag dipped in melted sulphur.

At the Hôpital St. Louis in Paris the treatment is this:—The patient immediately after admission, is thoroughly scrubbed with common soap, from head to foot, for thirty minutes. He then has a warm bath, in which he remains for an hour; during which time he is again scrubbed. On quitting the bath he is well rubbed for half an hour with an ointment composed of three ounces of carbonate of potash, dissolved in three ounces of distilled water; sublimed sulphur, six ounces; and lard, twenty-three ounces. These ingredients are thoroughly mixed together. By this means the acari are killed; and thus the patient may be said to be cured in two hours. In fact, a few more simple baths complete the treatment.

An aggravated form of itch known as *Norwegian scabies* (scabies crustosa) has been occasionally observed in different parts of Europe. It is only peculiar in its great severity; and in its presenting large scaly crusts, which are composed of epithelial cells, acari and their eggs and excrement, sebaceous matter, and lymph. The parasite is identical with that commonly met with.

8. PHTHIRIASIS

Is the disease induced by lice or pediculi. The human body may be infested with three kinds of lice—viz. the *Pediculus corporis* vel *P. vestimentorum*, the *P. capitis*, and the *P. pubis*. All are oviparous, the eggs being known as *nits;* the sexes are distinct; while the young are hatched in five or six days, and in eighteen days are capable of reproduction.

The *body* or *clothes louse* is of a dirty white colour, and from one to two lines in length. Its head is irregularly oval, with two antennæ, and prominent eyes; the abdomen is thrice as broad as the thorax; and from the latter three legs are developed on each side. This louse seems to live in the clothing, attacking the skin for its nourishment. The irritation which it produces is very great, while the scratching resorted to for relief gives rise to a pruriginous rash.—The *head* or *common louse* is smaller than the preceding, and is never found anywhere but on the scalp, where it multiplies abundantly. Its body is flattened and rather transparent; it is of a grey colour, or of a red hue when full of food; and its thorax, one-fourth the length of the abdomen, has three limbs on each side.—The *pubic* or *crab louse* attaches itself especially to the hairs about the sexual organs; but it is also found on those of the axillæ, and even on the eyebrows. As far as is known, it never invades the head or beard. It resembles the other lice save that its body is large and flat, without any defined separation between the thorax and abdomen. It clings to the roots of the hairs, and deposits its nits on these structures.

In some very rare instances there appears to be a constitutional condition favouring the development of pediculi, or at all events of the soil which is congenial to them; so that the statements of old authors "that divers persons have come to their ends, being devoured by lice," are not so very improbable.

The *pediculus corporis* or vestimenti is perhaps the most important to mention. Generally speaking the pediculus vestimenti, which induces phthiriasis corporis, is found in the folds of the linen worn next the skin in elderly and uncleanly people. It merely finds its way to the skin to get food. It has a proboscis or sucker, and, according to Dr. Tilbury Fox, it produces a peculiar hæmorrhagic speck, which is quite characteristic, in its attack upon the skin; and this gentleman describes phthiriasis as consisting of this characteristic lesion with, in addition, the results of irritation and scratching, viz., a pruriginous rash, wheals, excoriations, &c. This pruriginous rash is noticed especially about the shoulders, the base of the neck, the back, the legs, and the upper part of the arm's socket, but if the disease has existed long, all over the body; so that the presence of a pruriginous rash about these parts in old people is at once suggestive of the presence of the pediculus vestimenti. The characteristic lesion is a cup-shaped depression, in the centre of which is a blood crust. It is produced thus:—The pediculus puts its proboscis into a pore, and dilates it in the act of suction. As it withdraws its proboscis a little blood wells up into it, so as to fill the follicle, or rather its dilated orifice, which appears as a circular depression. This disappears, however, in a few days. Phthiriasis is to be cured by giving the patient warm baths, and disinfecting the clothes by heat; for the pediculi live in reality in the clothes and not on the skin. Phthiriasis corporis is in reality the prurigo senilis or hospital prurigo of the older writers.

The presence of lice is easily determined by a careful examination. The irritation produced by these disgusting insects can scarcely be mistaken for that caused by the common Flea (*Pulex hominis*, vel *P. irritans*), the bite of which is seen as a dark speck in the centre of an erythematous spot; or for that produced by the Chigoe, or Jigger, or Sand flea (*Pulex penetrans*), which is so annoying to the residents of Guiana and Brazil; or for that originated by the Harvest Bug (*Leptus autumnalis*, vel *Acarus autumnalis*); or for that developed by the stinking Common Bug (*Cimex lectularius*), the bite of which causes a hot and tumid spot having a whitish central point; or for that set up by the Mosquitos and Common Gnats (*Culex pipiens*), the bites of which are so intolerable in warm countries as well as in Lapland.

The Pimple mite (*Steatozoon folliculorum*) rarely gives rise to any itching or discomfort. This species of acarus has a worm-like form, and a length varying from the fiftieth to the hundredth part of an inch; it inhabits the ducts of the sebaceous glands, and especially those about the alæ of the nose; while it is probably to be found in the great majority of persons, only becoming troublesome by excessive increase. In such a case, these parasites may be destroyed by rubbing in calomel, or by washing the affected part with a weak solution of corrosive sublimate.

9. DRACONTIASIS.

Dracontiasis [from Δράκων = a serpent] may be described as a singular helminthic desease, produced in the human body by the presence of the Guinea worm.

The Dracunculus medinensis, Filaria medinensis, or Guinea worm, has a slender cylindrical body; which is sometimes nearly as thick as a crowquill, and which varies in length from one to ten or twelve feet. The worm is endemic in some parts of Asia and Africa, especially in marshy districts; while persons returning from these countries occasionally bring this nematode helminth back with them. According to Küchenmeister it is probable, that the "fiery serpents" which "bit the people, and much people of Israel died," were dracunculi; and if so, then Moses is the first writer who has referred to these worms. At at events, it is impossible to doubt that Plutarch describes the dracunculus in the eighth book of his "Symposiacon," where he makes Agatharchides of Cnidos, who probably wrote about B.C. 140, narrate "that the people taken ill on the Red Sea suffered from many strange and unheard of attacks; amongst others, worms, like little snakes, came out upon them, which gnawed away their legs and arms, and when touched again retracted themselves, coiled themselves up in the muscles, and there gave rise to the most insupportable pains." The dracunculus proves very troublesome in the present day, in certain districts. Thus one or more stations (Matoonga, in Bombay, for example) for our troops in India have had to be abandoned solely on account of the extensive presence of the Guinea worm in the tanks and wells.

At present we are chiefly familiar with the adult female dracunculus, which reproduces viviparously; the active embryos being found in stagnant pools, in the soil forming the foundations of artificial reservoirs, as well as in damp mould and mud.

The common seat of the Guinea worm, in the human body, is the subcutaneous connective tissue, and especially that of the extremities. It has very rarely been found in the tongue, but more frequently in the scrotum. In an analysis of 181 cases by Sir James McGrigor, it appears that the feet and legs were affected in 157. The impregnated worm probably perforates the sweat ducts of the skin, and thus effects a lodgment. It may give rise to no symptoms for some months; and then the first indication is usually a feeling of irritation in the affected part, where a cord-like ridge can often be felt. There may also be much constitutional disturbance, such as fever, headache, nausea, colic, and debility: though sometimes only local pain is complained of. A kind of boil usually forms, in the centre of which a black point will perhaps be seen; while on the pustule breaking, the head of the worm may protrude. If the latter be injured, a milky fluid may be discharged, which will be found on a microscopic examination to be loaded with minute dracunculi. When the head protrudes, a thread may be placed around it and rolled upon a small stick or piece of bougie; and then day by day the worm is to be gently drawn out, and wound round the stick until the extraction is complete. Where the worm does not protrude, but can be felt as a firm catgut-like swelling under the skin, an incision had better be made so as to expose it; the parasite being at once removed in a loop, or being partially lifted up so as to admit of the insertion of a wedge of wood round which it is to be daily coiled until the whole can be withdrawn without any fracture. According to Dr. Horton, tincture of assafœtida, in doses of thirty drops thrice daily, acts as a poison to this parasite. As such a dose can be taken by the bearer of the worm without any disturbance, no misgivings about the result ought to prevent our giving this drug a fair trial.

With regard to prophylactic measures all individuals travelling in districts where the Guinea worm is found should take care to have the feet well covered; to dry the skin thoroughly after bathing or wading through pools, marshes, &c.; and to avoid lying on the damp ground with any part of the body exposed to the soil. In the native country of the worm English officers suffer very much less frequently than the private soldiers, inasmuch as they do not go about with bare feet and arms.

PART XV.

DISEASES OF THE APPENDAGES OF THE SKIN, &c.

I. DISEASES OF THE HAIR.

THE diseases of the hair which are due to the presence of a parasitic fungus having been already described, it only remains to notice those that arise from general causes. Like other structures, these horny appendages of the skin are affected by the health of the bearer; marked examples of which influence are seen in the production of grey hair from mental anxiety, premature decay, and old age. Numerous diseases also (such as fever, syphilis, phthisis, &c.) produce loss of hair, owing to their interference with the nutrition of the hair bulbs and of the tissues in their immediate neighbourhood. The use of hair dyes often proves very prejudicial; for if they contain nitrate of silver they irritate the scalp and injure the hair follicles, while those made with oxide of lead may possibly give rise to severe colic. Many cases are known where the hair has become quite grey from the effect of depressing circumstances; and yet, when these circumstances have improved, this appendage as it has grown has been developed of the colour natural to the individual.

Every single hair may be supposed to have a life of its own, and hence to pass through the three stages of growth, maturity, and decay. Each one, likewise, seems liable to disease and premature death. But our philosophy fails to teach us why the hairs of certain regions are so much more prone to early decay than those of other parts. Why, for example, should we so frequently find a man of forty with a bald scalp independently of any local disease, while the vigour of the hairs upon his chin, eyebrows, and pubes remains uninterfered with? If this change be due, as some assert, to a diminution of the subcutaneous fat, why are not women affected more frequently? But, in fact, many men are bald whose scalps appear thick, and where the adipose tissue is present in proper quantity. Moreover, it it difficult to give any satisfactory explanation of the fact that in some regions more than others the fall of the hair is attended with destruction of the follicles. When an eyelash dies and is thrown off, the follicle soon produces a successor; but this is not as constantly the case with regard to the hairs of the scalp. It is, however, very difficult to say from the appearance of a part whether the hair follicles and bulbs have been destroyed or not. No greater degree of baldness can be shown than is present in cases of tinea decalvans, the affected spots being perfectly white and smooth and polished. Yet by proper treatment the follicles can be stimulated so as to produce a new crop of healthy hair. And even in the baldness of old age, when the follicles and bulbs are obliterated, it is possible that a new set may be developed. "We are aware," says Dr. Graves, "that the least highly organized tissues are capable of being reproduced after having been destroyed; now many facts have come under my notice which seem to authorize the conclusion, that when the original stock of bulbs has been destroyed in the scalp, a new stock is frequently developed by the powers of nature, and thus an entirely new crop of hair arises."* As affording presumptive evidence of the soundness of this view Dr. Graves cites the histories of several individuals, who at an advanced age, have had their failing sight completely restored; while he mentions the cases of others, in whom, after the threescore years and ten have been attained, a new set of teeth has been cut.

Loss of hair, or *baldness*, or *alopecia* [from 'Αλώπηξ = a fox—because this animal is said to be liable to baldness], may be partial or general; while it can occur at any period of life, may be temporary or permanent, and is much more commonly observed in the male than in the female sex. In a few rare instances there has been a congenital absence of hair, owing to some imperfect development of the apparatus which secretes this appendage. Senile calvities [*Calvus* = bald] usually takes place gradually, the hair first becoming thin about the crown, and on the temples and forehead. It is a consequence of the general loss of power, the hair follicles, like most of the other organs, participating in the general weakening of the nutritive functions; while as the follicular apparatus is destroyed, the loss generally proves irremediable. But in the baldness which occurs from debility, hæmorrhages, fevers and other acute diseases, tuberculosis, syphilis, &c., the organs which secrete the hair usually remain entire though inactive; and then by giving tone, locally and generally, a cure may oft-times be effected. The remedies therefore must consist of such agents as will aid the digestion of nourishing food, as well as of steel and quinine and cod liver oil; while stimulants are to be used locally to excite the capillary circulation through the scalp. Amongst the latter agents may be mentioned brushing, kneading, and friction of the scalp; the occasional application of the liniment of cantharides, diluted in proportion to the effect which it is desirable to produce; with the use of embrocations which irritate without blistering (F. 287). An ointment of iodide of sulphur, or of creasote, or of iodine, or of Peruvian balsam will also be found useful. In addition, the hairs which have not fallen ought to be cut short, those especially which appear withered and split being clipped close to the skin; while the scalp is to be well brushed, care being taken not to injure the new downy hairs (*lanugo*).

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* *Studies in Physiology and Medicine*, by the late Robert James Graves, F.R.S., p. 338. London, 1863.

Hirsuties [from *Hirsutus* = hairy], or *an augmented growth of hair*, is sometimes observed in association with constitutional debility. The hair of the head is often very long, and the eyelashes thick, in strumous and phthisical subjects. Hair, in small quantity, may also be developed about unusual situations (local hypertrichosis), as on the surface of the mucous membrane of the mouth, intestinal canal, bladder, vagina, &c. Women advanced in life, especially perhaps if they have never borne children, frequently have hair developed on the chin and upper lip. Moles, mother's marks, or nævi pilosi [*Pilus* = a hair] consist of dark coloured patches, covered with hair. They are formed by irregular deposits of pigment, with enlargement of the hair follicles and bulbs; the capillary vessels being normal, instead of increased in number and size as in vascular nævi. Pilous nævi are often about the size of a sixpence, but occasionally they are seen of much greater extent. In a case mentioned by Alibert, the skin of nearly the whole body was studded with black moles which were covered with dark and thick woolly hair.

Every now and then cases are seen where there is an abnormal superabundance of hair over the whole body (universal hypertrichosis). Julia Pastrana who was to be seen in London a few years since not only had a fine beard, but her whole body was extraordinarily hairy; while her little son seemed about to have as much hair as his mother. Many similar cases have been described and figured by Dr. Beigel in his interesting little work on the structure and diseases of the hair.

A loss of the colour of the hair, or *canities* [*Canus* = grey hair], may depend upon disease or on advanced age, while it will also now and then arise from deep mental emotion. In a few instances partial canities is congenital, one or more patches of the whitest hair being found surrounded by locks of a dark colour. In the Albino the whole of the hair seems deprived of colouring matter. Bichat has particularly noticed the influence of the different passions of the mind upon the internal structure of the hair, its colour being often changed by grief in a short period; and he speaks from personal knowledge, of five or six examples in which the loss of colour was complete in less than eight days, while in one instance the hair became almost entirely blanched in a single night. The cases of Marie Antoinette, Mary Queen of Scots, Sir Thomas More, &c., are well known to students. In senile canities the greyness occurs gradually, white hairs being found amongst those of the ordinary colour; the number of the former steadily increasing until the latter have been quite supplanted. This change often commences in men shortly after the age of forty.

The hair will sometimes grow in a wrong direction. Thus, the points of five or six eyelashes (especially those of the upper lid) may project on to the surface of the eyeball, giving rise to very considerable irritation and annoyance. *Trichiasis* [from Θρὶξ, τριχὸς = the hair] is to be cured by slowly and steadily removing each eyelash with broad-pointed and well-grooved forceps, and then dabbing the part frequently with spirits of wine to destroy the follicle. In *distichiasis* [Δὶς = double + στίκος = a row] the tarsus has a supernumerary row of cilia, the points of which irritate the conjunctiva and cornea, as in trichiasis.

A peculiar disease of the hair known as *Plica Polonica* [from *Plico* = to twine together], or *Trichonosis plica* [from Θρὶξ = the hair + νόσος = disease], or *Polish Ringworm*, is endemic in Poland and in some parts of Russia and Tartary. It is characterized by considerable tenderness and inflammation of the scalp; the hairs become swollen and imperfectly formed; while the hair-follicles secrete a large quantity of viscid reddish-coloured fluid, which glues the hairs together and unites them into tufts or felt-like masses. When the disease is of long standing, two cryptogamic plants (the Tricophyton tonsurans and Tricophyton sporuloides) have been detected by a minute examination. The real cause, however, is probably dirt. Sometimes, the matted hairs are loaded with pediculi. This Polish disease is not confined to the scalp, but appears apt to involve the hairs on any part of the integument. The odour from the affected parts is said to be most disgusting.

II. DISEASES OF THE NAILS.

The nails may be described as horny shields, originating in a fold of the cutis vera, and so placed as to protect the ends of the fingers and toes. In very rare cases there is a congenital absence of one or more of these appendages; while equally seldom we find supernumerary nails, or a nail is developed in an unusual situation—as on the stump of an amputated finger. Occasionally these organs are shed with some degree of regularity; a new one being formed which gradually loosens and throws off the old structure placed above it. The nail may be also cast off in consequence of a whitlow, when the inflammation has commenced near the matrix. As the growth of the nails, both in length and thickness, is regulated by the rate of general nutrition, so during sickness their development is retarded. This point of retardation is generally shown by one or more transverse furrows, owing to the part secreted during illness being thinner than that formed in health; and hence it has been said that the nail presents a sort of register of the state of nutrition during its existence. The furrow is usually most distinct on the thumb nail, and is sometimes even confined to this part. Next in frequency to the thumb nail is that of the index finger. I think also I have seen it more marked on the left than on the right hand; but this I believe to have been an accidental occurrence. A curving of the nails, with clubbing of the last phalanges, has been sometimes observed in phthisis, cyanosis, &c. The thumb nail probably takes about twenty weeks in growing from its root to the free margin.

In-growing of the nail, or *onyxis* [from Ὄνυξ = a nail or hoof], is a painful condition which not unfrequently occurs on the outer part of the great toes, and which is usually produced by ill-fitting boots. The side of the nail is pressed into the flesh at its margin; the pressure and irritation being increased by walking, so that inflammation and ulceration are soon set up. The ulcer becomes covered with flabby and sensitive granulations, and there is an unhealthy discharge. A cure may often be effected by removing the pressure; by rest, with the leg elevated; and by scraping the side of the nail very thin, softening it by soaking in warm water, and then separating it from the sore with a little pellet of cotton wool carefully inserted under the edge. Where this treatment fails, as it will when the case has been neglected and the fungus granulations are prominent, the offending half of the nail had better be removed. As this operation is very painful, congelation must be employed or the patient should be placed under the influence of chloroform. The blade of a pair of strong sharp-pointed scissors is thrust up under the nail to the matrix, the nail is divided, and the strip is drawn out with the forceps. The subsequent use of water dressing, or of the common red lotion (F. 264) if the granulations are indolent, will quickly heal the sore.

Disease of the matrix, or *onychia* [from Ὄνυξ = a nail] consists of a tedious ulceration about the root of the nail. It may arise, as it not very unfrequently does in children, from a depraved state of the constitution; or it is sometimes caused by a mechanical injury —especially by a severe crush or bruise. There is pain and swelling at the root of the nail, and about the surrounding skin; on pressure, a sanious discharge exudes at the sides; the nail gets raised, is turned upwards, and finally becomes detached so as to expose a foul ulcer; while this ulcer looks glazed and irritable, and often shows a tendency to extend in all directions. Occasionally, the distal phalanx becomes necrosed. When the disease is severe it is often improperly spoken of as *onychia maligna*. In some cases of syphilis a peculiar discoloration and crumbling of the nails is observed, with or without ulceration about their roots; the appearances being similar in kind but less pronounced than those seen in psoriasis. Supposing that the nail is merely loose it ought to be removed, so as to allow of the ulcerated surface being dressed with blackwash or red lotion, or nitrate of lead ointment. The patient must be fed well, and should take cod liver oil. In obstinate cases a mixture of arsenic and chlorate of potash and steel (F. 402) will prove very serviceable. In onychia associated with constitutional syphilis, local fumigation with calomel is deserving of trial; while the red iodide of mercury (F. 54) may be administered internally.

A peculiar condition termed *psoriasis of the nails* has been met with every now and then. In many instances it appears to be the consequence of an old syphilitic taint. The nails first become discoloured, thickened, and rough; then they get raised and assume the appearance of a coarse scab; while at last they crack, and crumble away, and separate at their roots, leaving an unhealthy fissure. Arsenic (F. 52) is the only remedy which exerts any influence upon this chronic affection. Where there is a history of syphilis, Donovan's triple solution (F. 51) should be employed. Local remedies are usually of little service. The application of a mixture of equal parts of the calomel and creasote ointments might perhaps assist the cure.

Favus of the nails [technically known by the uncouth term "onychomycosis," from Ὄνυξ = a nail + μύκης = a fungus] is a disease which once in a way attacks individuals affected with tinea favosa. The irritation of the scalp causes the sufferer to scratch it; and thus the parasitic fungus (the Achorion Schönleinii) gets transferred beneath the nail, where it finds a fitting soil for developing roots and germinating. As the yellow favus material increases, so the nail gradually increases in thickness; ultimately becoming perforated by the fungus. When such perforation has occurred a cure can be effected by the free use of a corrosive sublimate lotion. Where, however, the case is seen prior to this occurrence, the most projecting part of the nail should be scraped with a piece of glass so as to form an opening through which the parasiticide lotion can soak.

Where the nail has been cracked or injured prior to the parasite getting attached to it, the tubes and spores of the fungus may penetrate the structure of the nail through this injured part, and so become developed until they reach the root. The nail may then loosen and be thrown off; or it will split up and cast off thickened layers of unhealthy structure.

Produced like favus unguium, we sometimes meet with another variety of parasitic onychia, viz., *ringworm of the nails;* in which these structures are rendered brittle and apt to split longitudinally. The parasite (the Tricophyton tonsurans) must be exterminated as in the preceding instance.

Hypertrophy of the nails can scarcely be called a disease. It is often met with in bedridden persons, as the consequence of neglect. The nail of the great toe may thus attain an extravagant length and thickness; while by curving inwards, and pressing into the flesh of the foot, it will produce much pain and inconvenience. A nail altered in this manner can usually be easily removed. It is only necessary to grasp it firmly with the ordinary dressing forceps, and then with a little tact evulsion will quickly be accomplished.

III. WARTS, CORNS, AND HORNS.

Warts, or *vegetations,* or *verrucæ* [from *Verruca* = a wart], consist of collections of hypertrophied cutaneous papillæ; each papilla being separate and merely covered with thin cuticle, or a bundle of papillæ being bound together by an excess of dry and hard scaly epithelium. Both varieties are equally common. Warts may occur singly or in groups; they are especially frequent in children and young people; the hands and fingers are their most common seats, though they may be met with on the scalp and on the face and on other parts of the body (see vol. i. p. 325); and they may be caused by anything which irritates the skin, particularly if there be any hereditary tendency to them. The warty growths which form upon the face in elderly people, those which are produced by soot on the scrotum of chimney-sweeps, and those which rarely occur on old cicatrices, are forms of epithelial cancer. The secretion from simple warts is probably non-contagious; while there is no reason for believing in the popular theory that the blood from a wart will produce a similar growth wherever it is applied. Attention to cleanliness and the employment of some caustic, will generally cure the common warts. Nitrate of silver, glacial acetic acid, the acid solution of nitrate of mercury, may be applied on two or three occasions; or the growth can easily be snipped off with a pair of curved scissors, and the wound dressed for a day or two with any simple astringent lotion.

The hypertrophied and condensed masses of epidermis which are known as *corns* are produced upon prominent parts of the body by pressure. Thus they are most frequently met with on the toes owing to the irritation of badly made boots, or on the soles of the feet; while they also occasionally form on the elbows and knees, or on the extremities of the fingers in those who play upon stringed instruments. Some corns are more painful than others; the annoyance and suffering being often considerable when the callosity is seated on the projection of a deformed toe. Where there is acute bending of the phalanges from extreme contraction of the flexor tendon, a prominent site is offered on which a corn frequently grows; and I have known so much suffering thus produced that the patient has willingly submitted to amputation of the toe, after finding that the subcutaneous division of the tendon has been useless. The pain arises not so much from the pressure of the hardened epidermis, as from the prolongation of one or more of its fibres (commonly known as the roots) into the true skin.

Soft corns are formed between the toes, and more frequently on the outer side of the fourth than on any other toe. They are kept soft or spongy by the warm exhalations from the sweat glands of the adjoining tissues. Occasionally, an irritable wart is mistaken for a soft corn.

Corns can only be cured by the removal of the pressure which produces them. The boots or shoes must be made with thin upper leathers (particularly avoiding patent leather), and so shaped as to fit the foot properly. The socks ought also to be fine and light, and not unnecessarily loose. Then the sufferer must regularly attend to his feet, carefully cutting each corn with a sharp knife about every fourteen days; it being better to soak the feet in warm water for some fifteen minutes previously, than to try and shave away the hard tissue. In some cases a small piece of amadou plaster, with a hole punched out of its centre, may be applied with advantage. Should suppuration take place beneath a corn the foot ought to be well bathed, and the pus early let out by a small puncture.

A *bunion* consists of an enlargement and a thickening of a bursa,—generally of that one situated over the metatarsal joint of the great toe. It may be, but not necessarily, accompanied by distortion of the articulation. Occasionally the bursa suppurates, a fistulous opening being very commonly left after the evacuation of the pus. A very painful bunion is sometimes formed over the instep,—on the scaphoid bone; but it is less frequently met with than it used to be when men punished themselves with tightly-fitting Wellington boots. The only remedy for an ordinary bunion is a boot made so large, that the toes are not crowded together in a bunch. In bad cases, the use of buckskin, or of the material known as "pannus corium" is preferable to common leather.

Horns are made up of condensed and dried layers of epithelium, with or without a core composed of greatly hypertrophied papillæ. Their bases are freely supplied with blood. As they increase in size by the continual formation of new layers of epithelium, a tendency to become curved or spiral is usually manifested; so that they may assume the appearance presented by the small horns of the ram. These structures are but seldom met with in the human subject. They are more apt to grow from the scalp than from other districts; although occasionally they are seated on the face or trunk. Frequently a horn can be cleanly separated from its attachment to the skin by a gentle wrench; but where there are firm papillary prolongations into the growth, it may be necessary to make a couple of oval incisions. If the horn arise from the interior of a sebaceous cyst, as it may do on the scalp, the sac should be cleanly dissected out.

IV. BURNS AND SCALDS.

The casualties to be considered under this head vary very much as regards their local and constitutional effects according to the degree and duration of the heat applied, the extent of surface involved, the seat of the mischief, and the strength of the vital powers at the time of the accident. The great depression which follows immediately after the occurrence of an extensive burn will of course be felt more severely by a weak strumous subject, than by one whose constitutional powers have been previously kept up to the standard of health.

The annual mortality from burns and scalds in England is large. During the year 1866, the deaths registered from these causes were $\frac{\text{Males } 1323}{\text{Females } 1210} = 2533$; of which total there were 1327 children under five years of age. These figures are below the average annual deaths for the last eighteen years.

The number of deaths from this accidental and preventable cause it is satisfactory to know is steadily decreasing; from 162 deaths to each 1,000,000 of persons living in 1858, they have steadily diminished in frequency, till in 1871 only 116 persons out of 1,000,000 died from this cause.

Burns may be conveniently classified into four groups, according as they give rise to simple inflammation of the skin; to inflammation with separation of the cuticle and the production of blisters; to destruction of the papillary layer of derma or cutis; or to disorganization of the entire skin, possibly with injury to the connective tissue and muscles and other soft parts.

(1) *The burn which produces simple inflammation of the skin* is characterized by redness of the affected part, slight swelling, and severe smarting pains which last for some hours. It may be

caused by the momentary application of hot water, or of steam, or of the rays of a strong fire, or of the flame from a gas explosion. Unless the extent of surface injured be large, the constitutional disturbance in these cases is slight; while the local effects cease in a few days with desquamation of the cuticle. Even in gas explosions, the mischief sustained by the sufferer is chiefly due to the violence with which he is blown down, and not to the action of the flash of flame.

(2) *Inflammation of the skin with the production of blisters filled with serum* results from a more severe burn. The skin becomes tense and red and swollen; while to relieve these effects there is a spontaneous exudation of serum under the injured part. The vesicles are often large, and the pain is hot and smarting. If the vesicles get broken or rubbed off, the excoriated derma becomes exquisitely sensitive. After a scald the elevated epidermis will often peel off in one piece. Thus, I have seen a child's hand, scalded by a mug of boiling beer being upset over it, throw off the cuticle in one piece—like a glove. With more favourable cases the epidermis only exfoliates subsequently, and the part is restored to health without leaving any mark; but not unfrequently suppuration or superficial ulceration takes place, and a cicatrix is left to show the extent of the mischief. The constitutional symptoms are often severe, the shock to the nervous system being especially felt by delicate children.

(3) *Destruction of the papillary or superficial layer of the derma* cannot always be distinguished from those cases where the whole thickness of the skin is involved. It may, however at times be recognised by noticing that the cauterized tissue is converted into a greyish or brownish slough; the surface of which although insensible on being slightly touched, becomes very painful if pressure be made on it. Where the heat has been intense, the part exposed to it has at once become converted into a dry and dark-coloured eschar; but where the destroying agent has proved a little less powerful, then an ordinary vesicating gangrenous slough has resulted. Under any circumstances, as the eschar, or the slough, begins to separate from the living tissues, at the end of about four days, severe pain gets established; the only partially destroyed sensitive cutis constituting a very delicate sore surface. The suppuration may be excessive, if the subject have previously been in bad health. After the ulceration has healed, a firm white cicatrix remains as a permanent mark of the accident.

(4) *Disorganization of the entire skin (possibly with destruction of the subcutaneous connective tissue, muscles, fasciæ, and other soft structures)* takes place when the heat is very great and its application much prolonged. This form is more often produced by the clothes catching fire, or by a fall into a vat of boiling liquid, than in any other way. Lunatics will sometimes voluntarily produce such an amount of mischief; while epileptics may involuntarily

cause it by tumbling upon the open grate. The pain is most excessive during the application of the burning body, but ceases soon afterwards owing to the destruction of the vitality of the part. A black and hard and dry eschar forms (or a soft eschar in scalds) which at the end of three or four days begins to be detached by suppuration: when perfectly separated, a deep ulcer is left behind. This ulcer gradually heals by granulation; but an indelible cicatrix is formed, which has a great tendency subsequently to contract. Indeed, where the whole thickness of the skin has been destroyed it seems impossible to prevent subsequent contraction of the cicatrix, though much may now be done by skin-grafting. When the contraction is excessive, considerable deformity is likely to result. Thus, in burns of the neck, the chin may be drawn down to the sternum and fixed there by the tightening of the cicatrix; in burns involving the pectoral muscles, &c., the arm will perhaps be drawn immovably to the side of the trunk; in burns about the face, the most frightful appearances are likely to be caused by the dragging down of the eyelids, lips, &c.

The constitutional symptoms of the last two classes of burns are very important, and of two distinct kinds—viz., primary and secondary. The *primary symptoms* are due to the shock and pain; as well as to that congestion and irritation of the cranial, thoracic, and abdominal viscera which often follow quickly after the accident. The shock to the nervous system from the agonizing sufferings may even destroy life almost at the onset; but where the patient survives this, the pain can (by exciting the heart, brain, and spinal cord) give rise to dangerous congestion of some of the vital organs. In the one case there will be extreme prostration, stupor or coma, and coldness of the extremities: in the other, restlessness and excessive excitement, terror or delirium, and a high degree of fever. The *secondary symptoms* accompany the inflammation and suppuration which is set up for the removal of the destroyed tissues. The inflammation when severe produces general fever with symptoms of cerebral or pulmonary congestion; but it is soon followed by exhaustion, which increases the longer the suppurative stage continues. Convulsions or delirium often precede death where there is extreme prostration. Sometimes there is merely complete collapse from which the patient cannot be roused. If there be considerable cerebral congestion death will happen during the state of coma

The stage of depression has a variable duration; dependent partly on the age and constitution of the patient, partly on the amount of mischief. Attacks of sickness, cough, dyspnœa, diarrhœa, jaundice, &c., are not very uncommon.

Reference has already been made to the opinion that a sloughing ulcer sometimes forms in the upper part of the duodenum within a few days after a severe burn, and doubtless in consequence of it (see p. 126). Sometimes, this ulcer has rapidly proved fatal by causing hæmorrhage, or by setting up an acute attack of general peritonitis in consequence of perforation.

A careful *prognosis* is necessary. In some instances the shock to the system is so great that the patient never rallies, but sinks within twenty-four hours of the accident. With other cases it will perhaps be difficult to persuade the sufferer to go to bed, the injury in his opinion being insufficient for such great care; and yet at the end of some twelve or eighteen hours he may become comatose, and die in the course of the second day. Where the burn has been caused by the clothes catching fire, a serious result is very often to be apprehended. The terror, excitement, and shock are excessive; while the extent of affected surface is usually great. If the sexual organs be much injured, recovery is a rare event. Supposing the immediate dangers to be escaped, there is still a trying time to be gone through. A fatal termination may be brought about by inflammation of one of the vital organs; or it can happen from the exhaustion produced by pain, inability to take nourishment, excessive suppuration, &c. Now and then, as already mentioned, death has been due to a gastric or duodenal ulcer leading to perforation or hæmorrhage.

With regard to the *treatment* it ought to be recollected, that the two very frequent causes of early death after burns and scalds are shock and exhaustion. The latter, especially, is always aggravated by pain. Hence the first object of the practitioner should be to quiet the nervous system; and this will be better effected by a dose of opium and a glass of negus or hot brandy and water, than in any other way. When the suffering is intense, or when the stomach rejects everything that is taken, then it may be advisable to put the patient under the influence of some anæsthetic (F. 313), and at the same time to inject a dose of morphia and atropine (F. 314) under the skin.

Each practitioner has some favourite local application. One of the best in my opinion is the common carron oil—the officinal linimentum calcis; which should be freely applied, and the parts then covered with a sufficient layer of cotton wool to exclude the atmospheric air. Cotton wool alone, kept in position by a few light turns of a bandage, at times suffices. Some physicians speak highly of the use of flour, thickly dusted over the burnt or scalded skin; and where there are no vesications it is useful. But when the cuticle is raised into blisters, these are apt to burst; and the serum mixing with the flour forms a dirty, irritating paste, which is with difficulty removed. When the vesicles are large, it is better to puncture them with a fine needle to prevent their rupturing; but care must be taken not to remove the elevated cuticle. The patient will generally find it more comfortable to lie between blankets, rather than in sheets; while if the mischief be extensive, a water bed must be used from the first. The importance of not disturbing the first dressings unnecessarily can hardly be too strongly enforced; for independently of the suffering which such meddlesome surgery will always give rise to, the admission of the air to the inflamed surface can only increase the mischief. When suppuration is setting in, warm light poultices or plain water dressings often give great relief; but if the inflammatory action is severe, cold goulard water lotions are to be preferred.

At the end of twenty-four or forty-eight hours reaction will be established; and the occurrence of internal congestions will then have to be guarded against. The state of the brain and its membranes, of the lungs and pleuræ, of the heart and pericardium, as well as of the abdominal viscera and peritoneum must daily be looked to. Simple effervescing salines and mild laxatives are valuable where the reaction is violent, or where there is congestion of any internal organ; and they often suffice to remove all danger. Supposing we have to treat a child under the influence of excessive reaction, great good will arise from inducing copious sweating; and in no way can this be better produced (when the child is irritable and restless, parched and thirsty, and with a hot dry skin) than by taking it out of bed, gently plunging it into a tub of water at 70° Fahr., and then enveloping it immediately in several warm blankets. A copious perspiration will soon break out over the whole body; and this is to be encouraged for several hours by freely giving sweetened water or barley water.

The subsequent management should depend very much upon the condition of the patient. The numerous symptoms must be combated as they arise; but great caution will have to be exercised in the employment of lowering measures. The progress towards recovery is usually tedious: our object must be to make it sure. The disorganized tissues can only be replaced slowly; and when such replacement is going on satisfactorily our chief duties are limited to removing all sources of irritation, and to taking all the steps we can (by using bandages, splints, india-rubber bands, and other mechanical contrivances) for the prevention of future deformity. It is always advisable to try and support the strength during the whole progress of the case by stimulants in moderate quantities, as well as by such nourishing food as can be digested. Chicken panada, soups, strong beef tea thickened with arrowroot, plenty of good milk, and two or three raw eggs daily are unexceptionable remedies. Cod liver oil will often advance the stage of convalescence. At the same time we must take care that the patient does not pass restless nights, but by the use of sedatives give ease and sleep. Even in the case of young children, although they are very susceptible to the influence of opium, yet this drug proves exceedingly beneficial; and when the injury produces great suffering they bear larger doses than in natural disease.

A rather extensive observation of nurses and their habits has shown me a favourite practice of these women which has not unfrequently led to most disastrous consequences. At the conclusion of the meal known as "tea," the nurse frequently fills the teapot with water; so that when the children complain of thirst in the course of the evening there may be something for them to drink. In allowing the child to quench its thirst, it is not deemed necessary to pour the cold tea into a cup; but the spout is offered to the lips, and a draught is given. This popular habit leads young children to prefer drinking through the spout as often as the opportunity presents itself; while unfortunately they sometimes avail themselves of the nurse's absence to do so when the teapot contains boiling water, or they even experimentalize with the kettle. Most severe scalds of the fauces, glottis, and pharynx have been thus produced; the spasmodic contraction of the constrictor muscles of the pharynx preventing the passage of the fluid further downwards, and so saving the stomach. In the *treatment* of these cases we must be guided by the principles already laid down: opium, and soothing diluents (such as treacle and water, or mucilage with liquorice, or linseed tea with honey) being especially required, followed if necessary by the bath. When œdema of the glottis arises, relief may perhaps be given by making rather free scarifications; but if suffocation seems to be imminent, laryngotomy or tracheotomy must be quickly performed. Unfortunately the operation does not often succeed, owing to the prostrating effects of the scald upon the system generally.

V. FROSTBITE AND CHILBLAINS.

1. FROSTBITE.

Severe cold when long continued, produces insensibility, arrest of the circulation, and death of the part to which it is applied. Where the whole frame is exposed to intense cold, the vital powers get much depressed. The heart's action gets diminished in frequency, and there is a strong desire for sleep. If this desire be gratified, the sleep soon passes into coma which will end in death. Examples of frostbite or gelatio [from *Gelo* = to freeze] are very rarely seen in this country; but the unfortunate children of drunken parents have suffered severely from it, after exposure to the keen night air of winter. The management of such cases consists in gradually restoring the circulation to the affected part: friction with snow or cold water, followed by the cautious use of stimulants, being the best means of effecting this restoration.

2. CHILBLAIN.

A chilblain, or mild degree of frostbite, is the result of a suspension of vitality in a limited portion of the skin from the action of cold on the nerves and capillaries. The effect of the cold is not felt at first; but as warmth returns to the affected part there is much itching and tingling, and the toe or finger is found on examination to be red and swollen. This condition lasts for several hours or even days, and the part then resumes its healthy condition; or if the morbid action continue, vesication and ulceration take place, and what is called a *broken chilblain* results. It is essentially a disease of childhood.

The *treatment* must consist in making gentle attempts to restore the normal circulation and tone of the chilled member by frictions with powdered starch or stimulating liniments. For this purpose the iodine ointment, or the iodide of lead ointment, or the iodine liniment, or the ointment of elemi, or the ointment of resin mixed with an equal quantity of turpentine ointment, or the compound camphor liniment, or the turpentine liniment of the British Pharmacopœia may be prescribed; or the skin may be painted twice daily with the tincture of iodine. When the chilblain has ulcerated, it must be at first soothed by water dressing or by bread poultices mixed with goulard water; but subsequently (unless it heals kindly) it is often advisable to apply stimulating ointments, such as the ointment of resin mixed with a little turpentine. The constitutional powers will generally be found to be below the normal standard. Hence tonic medicines (especially F. 405) must usually be required, and attention will have to be paid to the digestive organs.

In the way of prevention few remedies are more serviceable than cod liver oil, which should be taken once or twice daily through the whole winter. Warm clothing and nourishing food are of course indispensable. Thin and tight-fitting boots and gloves are to be discarded during the cold months.

APPENDIX OF FORMULÆ.

In prescribing a medicine, attention must be paid to the following points :—Age, Sex, Temperament, Habit, Condition of System, Climate, and Season of the Year. The operation of most drugs is materially influenced by the form in which the medicine is given, the purity of the preparation, the time of day at which the dose is taken, and the condition of the stomach as regards the presence or absence of food. The succeeding formulæ are for Adults, unless the contrary is stated. The doses may, except in the case of mercurials and narcotics, be reduced by attention to this table :—

For an adult, suppose the dose to be	1	or gr. 60.
Under 1 year, will require only	1-12th	or gr. 5.
,, 2 ,, ,,	1-8th	or gr. $7\frac{1}{2}$.
,, 3 ,, ,,	1-6th	or gr. 10.
,, 4 ,, ,,	1-4th	or gr. 15.
,, 7 ,, ,,	1-3rd	or gr. 20.
,, 14 ,, ,,	1-half	or gr. 30.
,, 20 ,, ,,	2-3rds	or gr. 40.

Above 21, the full dose.
,, 65, the dose must be diminished in the inverse gradation of the above.

Children bear as large doses of mercury as adults ; but they are much more susceptible to the influence of opiates. Consequently, opium must be given in very minute doses to them. Females, also, from their more delicate organization and greater sensitiveness, require smaller quantities of powerful medicines than males. This is particularly the case during the periods of menstruation, pregnancy, and lactation.

The skill of the physician is shown by the administration of the proper remedy, in the proper quantity, at the proper time. A druggest's appreatice can tell what agents will purge, vomit, or sweat; but a man must be practically conversant with disease to be able rightly to apply his therapeutical resources to the exigences of any particular case. Instead of introducing medicines into the system by the stomach it is often more advisable to do so by the rectum, or by the skin, or by the lungs, or by injection into the areolar tissue. Absorption takes place from the rectum as speedily and surely as from the stomach; and hence purgatives, emetics, narcotics, tonics, and nutrients may be admirably administered as enemata. The skin offers a mechanical impediment to absorption ; but still poultices and fomentations, plasters, liniments and ointments, and medicated vapour or water baths are all valuable remedies. If the cuticle be removed by a blister, and the medicine applied to the denuded dermis in its pure state or incorporated with lard or mucilage, its action will be rapid. The system is quickly and thoroughly affected by the inhalation of medicated vapours, or of substances reduced to an impalpable powder. Subcutaneous injections must be employed with great caution ; since by this plan none of the medicine is lost, neither is it altered or diluted by the contents of the stomach, as happens when drugs are taken by the mouth.—In only exceptional cases can there be any advantage in procuring absorption through the conjunctiva, the nasal or pituitary membrane, or the mucous coat of the vagina ; but in these exceptional cases the benefit is often very great.—Injection into the veins is too dangerous to allow of its being practised except as a last resource in grave diseases,—such as epidemic cholera, snake-bite, &c.

The practitioner will do well to bear in mind the following rules:—(1) When a disease is progressing favourably towards recovery, it is unwise to interfere with the spontaneous effort at cure by the administration of drugs. The end and aim of treatment is not only to restore health, but to do so safely and speedily and pleasantly.—(2) Where drugs are needed, and there is a choice of remedies, employ that one which will be the least distressing at the time, and subsequently the least injurious to the constitution.—(3) Put the medicine into that form in which it can be most easily taken. When possible, especially with children, cover the disagreeable taste of the draught by syrups, &c.—(4) If there be an idiosyncrasy with respect to any special medicine—such as mercury, arsenic, iodide of potassium, opium, strychnia or nux vomica, quinine, assafœtida, turpentine, &c., avoid administering it. That a peculiarity of constitution, causing an extreme susceptibility to the influence of certain drugs and foods and odours sometimes exists, cannot be disputed. It is as certain that it can seldom be safely combated.—(5) Attend to the condition under which the patient will be at the period of the medicine's action: *e.g.*, it will be worse than useless to give a sudorific to an individual obliged to be in the open air soon after taking it.—(6) Be careful that the various agents in the prescription are not incompatible with each other, unless it be desired to form some new or particular compound. Chemical imcompatibility, however, is by no means synonymous with therapeutic inertness; for experience tells us that certain unchemical compounds—perchloride of mercury and tincture of bark, gallic acid and tincture of opium, calomel and compound ipecacuanha powder, &c., are all valuable preparations in curing diseases.—(7) Remember that if a disease be incurable, it may still admit of great alleviation. Hence it is cruel to give up any case; although, at the same time, the patient is not to be deceived by false promises.—(8) Never order, or sanction the use of, a quack medicine; *i.e.*, one the composition of which is kept a secret.—(9) Bearing in mind the weakness of human nature, as well as the prejudices and superstitions which are current, it is not only necessary to give good advice, but pains must be taken so to impress the patient and attendants that the necessary treatment may be thoroughly carried out. *Hope* and *confidence* are no mean remedial agents; and in many chronic diseases at least, the individual who has *faith* will recover more speedily, cæteris paribus, than he who is shy of belief.—(10) Simply to prescribe drugs, without regulating the diet and general management of the patient, is to omit a most important duty. In acute diseases plain directions must be given as to the ventilation and warmth of the sick-room, the amount of light, the position of the bed (not to be placed in a corner), the degree of quiet to be maintained, the avoidance of excitement and whispering, the exclusion of visitors, the cleanliness of the sufferer, and the nature and quantity and times for administration of food. No cooking whatever should be permitted in the sick-room. In cases of long illness, when the patient can be moved without risk, it is often desirable to have two beds in the room—one to be occupied during the day, the other at night. Every precaution must be taken to prevent the spread of infectious disorders. Soiled linen, dirty water, &c. must be immediately removed. And, in all instances, the evacuations ought to be passed in a bedpan or nightstool containing some disinfectant material (carbolic acid, permanganate of potash, sulphate of iron, &c.)—(11) While it is allowed that the following formulæ may often be employed unaltered with great advantage, yet it is not supposed that they will usually be prescribed with servile exactness; for it should never be forgotten that all medicines of any power have to be adapted to the requirements of the special case under treatment. It has been quaintly but truly observed, that a bundle of ready-made receipts in the hands of the routine practitioner is but a well-equipped quiver on the back of an unskilful archer.—And (12) in watching the restoration of a sick man to health, it is a mistake to attribute the improvement too confidently to the action of the medicine prescribed; for it may not have been taken, or it may not have been absorbed, or its properties may have been destroyed by adulteration, or it may have even proved injurious—recovery occurring in spite of it.

With regard to the manner of writing prescriptions the physician is strongly advised to adopt a clear and distinct style, as well as to give all the directions fully in the English language. Hieroglyphics and illegible scrawls, absurd abbreviations and bad Latin, are more fit for the work of astrologers or fortune-tellers, than for that of scientific men in the present day. Such caligraphic abominations may impose upon the vulgar; but people of sense merely view them as cloaks for ignorance. Looking at the public as a body, there is not the slightest reason why each member of it, when ill, should be kept in ignorance of the nature of the remedies he is asked to take. There is nothing unreasonable in a patient being afraid of mercury, arsenic, opium, &c.; but in nineteen cases out of twenty all fear will be banished by a straightforward explanation of the physician's reasons for prescribing such drugs. Surely he must be either a very credulous or thoughtless individual who will take a nauseous draught, he scarce knows why; to effect, he knows not what. And this being so. ought not medical men to be the last to foster such folly? Complaint is made of the enormous consumption of patent medicines; but if the public be educated blindly to take drugs without any question as to what such medicines consist of and what they are to accomplish, who can wonder that charlatanism thrives? The most formidable opponent to all kinds of medical quackery is the physician who carefully investigates the cases of disease which come before him, and who treats his patients as sensible beings anxious to know something of the nature of their complaints and how they are to be overcome.

The succeeding formulæ have been written in accordance with the rules, preparations, &c of the *British Pharmacopœia* of 1867. For the sake of convenience they are arranged in twenty-one classes, running thus:—

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The symbolic formulæ employed here and there in these volumes, have been represented according to the new method of notation.

I. ALIMENTS.

Formula 1. *Extracts and Essence of Beef.*

Take one pound of rumpsteak, mince it like sausage meat, and mix it with one pint of cold water. Place it in a pot at the side of the fire to heat very slowly. It may stand two or three hours before it is allowed to simmer, and then let it boil gently for fifteen minutes. Skim and serve. The addition of a small teaspoonful of cream to a teacupful of this beef tea renders it richer and more nourishing. Sometimes it is preferred when thickened with a little flour or arrowroot.

Essence of Beef.—Take one pound of gravy beef free from skin and fat, chop it up as fine as mincemeat, pound it in a mortar with three tablespoonfuls of soft water, and let it soak for two hours. Then put it into a covered earthen jar with a little salt; cementing the edges of the cover with pudding paste, and tying a piece of cloth over the top. Place the jar in a pot half full of boiling water, and keep the pot on the fire for four hours Strain off (through a coarse sieve, so as to allow the smaller particles of meat to pass) the liquid essence, which will amount to about five or six ounces in quantity. Give two or more teaspoonfuls frequently. *In great debility, diphtheria, typhus, exhaustion from hæmorrhage, &c.*

The *Extract of Meat Lozenges*, as sold by Allen and Hanbury, can sometimes be taken when the stomach is too irritable to retain beef tea. Each lozenge contains half its weight (or about eighteen grains) of pure Extract of Meat made after LIEBIG'S process. This quantity corresponds to the soluble constituents of an ounce and a quarter of solid flesh, and will afford the sustaining and restorative effect of soup or beef tea made from that quantity of meat.—A good broth may be made by dissolving four of these lozenges in a wineglassful of boiling water, or better still, of home-made beef tea, adding a little salt and pepper to taste.

Excellent meat extracts and concentrated beef tea are also prepared by Brand and Co., and Gillon, which are more trustworthy than domestic preparations, and are often invaluable in emergencies.

LIEBIG'S *Extract of Meat* is a valuable preparation. It is of uniform strength, one pound being the product of thirty-four pounds of pure muscular tissue. This corresponds to about forty-five pounds of butcher's meat (including fat, bones, connective tissue, &c.); so that the carcase of a good ox very seldom yields more than ten pounds of extract. It must not be supposed, however, that the extract is in any way the equivalent of the meat from which it has been obtained, or that it contains all the elements for nutrition. It is rather a stimulant than a food from which tissues can be built up, and may be injurious if relied on exclusively or taken in too large quantity and in a highly concentrated form. One ounce of this extract will make four pints of excellent beef tea; each pint representing the soluble ingredients of rather more than half a pound of beef. Besides mixing the extract with water it will often be advantageous to add it to common beef tea, to vegetable soups, to a mixture of brandy and eggs, or to wine. Sometimes invalids will eat it spread on bread and butter, or on toast, like a potted meat.

2. *Restorative Soup for Invalids.*

Take one pound of newly killed beef or fowl, chop it fine, add eight fluid ounces of soft or distilled water, four or six drops of pure hydrochloric acid, 30 to 60 grs. of common salt, and stir well together. After three hours the whole is to be thrown on a conical hair sieve, and the fluid allowed to pass through with slight pressure. On the flesh residue in the sieve pour slowly two ounces of distilled water, and let it run through while squeezing the meat. There will be thus obtained about ten fluid ounces of cold juice (cold extract of flesh), of a red colour, and possessing a pleasant taste of soup; of which a wineglassful may be taken at pleasure. It must not be warmed (at least, not to a greater extent than can be effected by partially filling a bottle with it, and standing this in hot water); since it is rendered muddy by heat or by alcohol, and deposits a thick coagulum of albumen with the colouring matter of blood.—If, from any special circumstance (such as a free secretion of gastric juice) it is deemed undesirable to administer an acid, the soup may be well prepared by merely soaking the minced meat in plain distilled water.—Children, and even adults, will frequently take the raw meat simply minced or grated, when they are suffering from great debility. One teaspoonful of such meat may be given every three or four hours. If found disagreeable, all unpleasantness can be removed by thoroughly mixing in a mortar two parts of pounded white sugar with one part of meat.

This modification of LIEBIG'S *formula is very valuable in cases of continued fever, in dysentery, and indeed in all diseases attended with great prostration and weakness of the digestive organs. When the flavour is thought disagreeable, it may be concealed by the addition of spice, or of a wineglassful of claret to each teacupful of soup.*

3. *Digested Milk and Soluble Meat.*

Milk, five ounces; pepsine, five grains; dilute hydrochloric acid, thirty minims. Digest in a water bath at a temperature of 120° F. for two hours, after which neutralize the acid by twelve grains of carbonate of soda, and sweeten with pure sugar.

Useful for children who are unable to digest milk, and in cases of extreme irritability of stomach.—SIR WILLIAM JENNER.

Soluble Meat.—About two pounds of lean meat, chopped into pieces, are put into a china pan, with a quart of water, containing half a fluid drachm of strong hydrochloric acid. The pan is then put into a Papin's kettle, perfectly sealed and subjected to maceration for about fifteen hours. The contents are then crushed in a mortar until they constitute an emulsion, and then put back into the kettle again for about fifteen hours. The substance thus obtained must be then completely neutralized with bicarbonate of soda, and evaporated afterwards to the consistency of pap. When thus prepared, this soluble meat is generally accepted by patients. Milk and pounded biscuit may, however, be added for the sake of variety, and in order to avoid too great uniformity of food.—DR. MARCET.

4. *Liebig's Food for Infants and Invalids.*

Half an ounce of wheaten flour (that called "seconds" is the most suitable), an equal quantity of malt flour, 7¼ grains of bicarbonate of potash, and an ounce of water, are to be well mixed. Add five ounces of cow's milk, and put the whole on a gentle fire. When the mixture begins to thicken it is to be removed from the fire, stirred for five minutes, heated and stirred again till it becomes quite fluid, and finally made to boil. After separating the bran by passing the mixture through a sieve, it is ready for use.

To save the trouble of weighing, it may be remembered that a tablespoonful (heaped up) of wheaten flour weighs nearly half an ounce, and a heaped dessert-spoonful of malt flour is equal to the same. This soup is as sweet as milk; and after boiling, may be kept for 24 hours without undergoing any change.—This is an excellent food for infants who cannot be suckled. It is slightly aperient; so that children under one year of age can seldom take more than two meals of it in the day. Where there is a tendency to diarrhœa, twenty grains of prepared chalk may be substituted for the potash. The proportion of blood-forming and heat-producing elements is the same as in woman's milk (1 : 3·8); while the quantity of alkali is equivalent to that in human milk.

The solid parts of this food are sold, ready mixed in packets, by Mr. Hooper of Pall-Mall East and Grosvenor-street, Mr. Cooper, of 26, Oxford-street, as well as by many other chemists. Barley malt can also be procured from every brewery. It may be ground in a common coffee mill; the coarse powder being passed through a sieve to remove the husks.

5. *Eggs, Cream, and Extract of Beef.*

Wash two ounces of the best pearl sago until the water poured from it is clear. Then stew the sago in half a pint of water until it is quite tender and very thick: mix with it half a pint of good cream and the yokes of four fresh eggs, and mingle the whole carefully with one quart of good beef tea, which should be boiling. Serve. *This nourishing broth is very useful in many cases of lingering convalescence after acute disease.*

6. *Mutton or Veal Broth—Beef Tea.*

Take of mutton or veal or beef one pound and a half, cold water one quart, a little salt, and rice two ounces. Simmer for four hours, boil for a few minutes, strain and serve. Another excellent plan for making beef tea is as follows:—Take one pound of beef minced very fine, and put it into a common earthenware teapot with a pint and a half of cold water. Stand the pot on the hob, so that it may simmer for at least three hours. About three-quarters of a pint of good beef tea will be thus obtained.

One pound of mutton, one pound of veal, half a chicken (with the bones well-broken), one calf's foot, and two quarts of water. To be stewed down to one quart. To be flavoured with pepper and salt, and taken cold as a jelly, or as a warm broth. The chicken can be omitted if desired.

Beef tea as ordinarily made, and preserved meat juice of all kinds, are palatable but not very nutritive drinks. A pint of fine beef tea contains scarcely a quarter of an ounce of anything but water. Nevertheless, if these fluids are of small value as mere nutrients, perhaps the osmazome and salts they contain may possess the property, like tea and coffee, of diminishing the waste of the tissues. It has been proved that dogs die slowly if fed on bread and gelatine alone; but when greatly reduced by this diet they soon regain flesh and strength if two ounces of meat tea be daily added to it.

Gruel mixed with beef tea is nourishing. It is made thus:—Take two tablespoonfuls of oatmeal with three of cold water, and mix them thoroughly. Then add a pint of strong boiling beef tea (or of milk); boil for five minutes, stirring well to prevent the oatmeal from burning; and strain through a hair sieve.—*An excellent simple restorative during convalescence from acute disease before solid food can be taken.*

7. *Spruce Beer.*

The essence of spruce is prepared by boiling down to concentration the young branches of the Black Spruce Fir (Abies Nigra). Take of this essence half a pint; bruised pimento and ginger, of each four ounces; water three gallons. Boil for five or ten minutes; then strain, and add eleven gallons of warm water, a pint of yeast, and six pints of molasses. Mix, and allow the mixture to ferment for twenty-four hours. *It is an admirable antiscorbutic, and is an agreeable and wholesome drink in warm weather. This drink was found very efficacious by* CAPTAIN COOK. DR. ROBERT BARNES *suggested that it should be used in the Merchant Service instead of rum, which has no antiscorbutic virtue.*

8. *Tapioca and Cod Liver.*

Boil a quarter of a pound of tapioca till tender, in two quarts of water; drain it in a cullender, then put it back in the pan; season with a little salt and pepper, add half a pint of milk, and put over one pound of fresh cod liver cut in small pieces. Set the pan near the fire to simmer slowly for half an hour, or a little more, till the liver is quite cooked. Press on it with a spoon, so as to get as much oil into the tapioca as possible. After taking away the liver, mix the tapioca. If too thick, add a little milk, then boil it a few minutes; stir round, add a little salt and pepper, and serve.—ALEXIS SOYER. *Tapioca thus cooked is nourishing and easily digested.*

9. *The Bran Loaf.*

The formula used by MR. CAMPLIN, in *Diabetes*, is as follows:—Take a sufficient quantity (say two or three quarts) of wheat bran, boil it in two successive waters for ten minutes, each time straining it through a sieve, then wash it well with cold water (on the sieve), until the water runs off perfectly clear; squeeze the bran in a cloth as dry as possible, then spread it thinly on a dish, and place it in a slow oven—if put in at night, let it remain until the morning, when, if perfectly dry and crisp, it will be fit for grinding. The bran thus prepared must be ground in a fine mill, and sifted through a wire sieve of sufficient fineness to require the use of a brush to pass it through: that which does not pass at first ought to be ground and sifted again, until the whole is soft and fine.

Take of this bran powder three ounces troy, three fresh eggs, one ounce and a half of butter, and rather less than half a pint of milk; mix the eggs with part of the milk, and warm the butter with the other portion; then stir the whole well together, adding a little nutmeg and ginger, or any other agreeable spice. Immediately before putting into the oven, stir in first thirty-five grains of sesquicarbonate of soda, and then three drachms of dilute hydrochloric acid. The loaf thus prepared should be baked in a basin (previously well buttered) for about an hour or rather more.

Biscuits may be prepared as above, omitting the soda and hydrochloric acid and part of the milk, and making them of proper consistence for moulding into shape.

If properly baked, the loaves or biscuits will keep several days; but they should always be preserved in a dry place, and not be prepared in too large quantities at a time.

10. *White Wine Whey.*

To half a point of boiling milk, add one or two wineglassfuls of sherry or Madeira. The curd is to be separated by straining through a fine sieve or piece of muslin. Sweeten the whey with refined sugar.

11. *Caudle.*

Beat up one egg with a wineglassful of sherry, and add it to half a pint of fine hot gruel. Flavour with sugar, nutmeg, and lemon peel. *In insomnia with debility.*

Beat up two tablespoonfuls of cream in a pint of thin cold gruel. Add to this one tablespoonful of curaçoa or noyeau, and a wineglassful of sherry. Flavour with sugarcandy, and let half a tumblerful be taken, cold, at intervals.

12. *Ferruginous Chocolate.*

Spanish chocolate 16 oz. ; carbonate of iron half an ounce. Divide into one-ounce cakes. One to be dissolved in half a pint of hot milk, and taken night and morning. *In anæmia, amenorrhœa, &c.*

13. *Iceland Moss and Quinine Jelly.*

Take of Iceland moss (Cetraria), and Irish moss (Chondrus crispus, Carragheen), each one ounce. Boil slowly for three-quarters of an hour in a pint and a half of milk, strain through muslin, and add three ounces of white sugar dissolved in one ounce of the compound tincture of quinia (equal to eight grains of the salt). A dessertspoonful to be taken frequently in the course of the day. *In phthisis, tabes mesenterica, &c.*

14. *Lime Water and Milk.*

℞. Liquoris Calcis Saccharati, min. 20—90, *vel* Liquoris Calcis, fl. oz. 1—4 ; Lactis, fl. oz. 4. Mix. *This compound will sometimes be retained when all other food is ejected. As a variety, milk and soda water in equal proportions, may also be ordered.* See F. 73.

It may be well to remember that the addition of grs. 15 of Bicarbonate of Soda to the quart of fresh milk not only prevents it from turning sour for several hours, but renders it more digestible.

15. *Artificial Ass's and Goat's Milk.*

Take half an ounce of gelatine, and dissolve it in half a pint of hot barley water. Then add an ounce of refined sugar, and pour into the mixture a pint of good new cow's milk.

Chop an ounce of suet (that of the calf is the best) very fine, tie it lightly in a muslin bag, and boil it slowly in a quart of new milk. Sweeten with white sugar, or a glass of any liqueur. *An excellent aliment in some cases of tabes mesenterica, &c., where the unpleasant odour of goat's milk prevents its being taken.*

16. *Milk, Flour, and Steel.*

Beat up carefully one tablespoonful of flour, one raw egg, and about twenty grains of the saccharated carbonate of iron, with half a pint of new milk : flavour with nutmeg and white sugar. To be taken for lunch with a biscuit. *In the early stages of tuberculosis the Author has found this mixture very valuable.*

17. *Brandy and Egg Mixtures.*

Take the whites and yolks of three eggs and beat them up in five ounces of plain water. Add slowly three ounces of brandy, with a little sugar and nutmeg. This form is preferable to that in the British Pharmacopœia for 1867 ; which form contains an insufficient quantity of egg, while it is spoilt for sensitive stomachs by the cinnamon water it is mixed with. Two tablespoonfuls should be given every four or six hours. In some cases of great prostration the efficacy of the mixture is much increased by the addition of one drachm of the tincture of yellow cinchona to each dose.

When the stomach is very irritable the following will often be useful:—Take a tablespoonful of cream and beat it up thoroughly with the white of a new-laid egg. Add slowly to the frothy mixture thus obtained, one tablespoonful of brandy in which a lump of sugar has been dissolved.

Let the white and yolk of an egg be beaten up in a wineglassful of water, with 15 drops of brandy and white sugar. Two eggs thus treated, in the 24 hours will serve for the food of an infant brought up by hand.

18. *Bread Jelly.*

Take a quantity of the soft part of a loaf, break it up, cover it with boiling water, and allow it to soak for some hours. The water—containing all the noxious matters with which the bread may be adulterated—is then to be strained off completely, and fresh water added; place the mixture on the fire, and allow it to boil for some time until it becomes smooth; the water is then to be pressed out, and the bread on cooling will form a thick jelly. Mix a portion of this with sugared milk and water, for use as it is wanted.—Dr. CHURCHILL. *A good food for infants at the time of weaning, for children with acute disease, &c.*

19. *Nutritious Demulcent Drinks.*

Mix together half a pint of Mucilago Acaciæ, Mistura Amygdalæ, and pure milk; sweeten with sugarcandy or honey; and add one large tablespoonful of any liqueur. Allow the whole to be taken during the day.—Or, a large pinch of isinglass may be boiled with a tumblerful of milk, half a dozen bruised almonds, and two or three lumps of sugar. To be taken warm once or twice in the day.

These drinks are very grateful in cases of tonsillitis, ulceration of the pharynx, &c.; also in some cases of debility, with irritability of the stomach, and a tendency to diarrhœa.

20. *Indian Sarsaparilla and Barley Water*

℞. Syrupi Hemidesmi, fl. oz. 2; Glycerini, fl. oz. 1; Decocti Hordei, fl. oz. 9. Mix, and direct one tablespoonful to be taken frequently. *An agreeable demulcent, slightly alterative, and diaphoretic mixture. Useful in the eruptive fevers, and for inflammations of the mucous membranes.*

21. *Beef Tea and Cream Enemata.*

An excellent nutritious enema can be made by mixing together from four to eight ounces of strong beef tea, an ounce of cream, and half an ounce of brandy or an ounce and a half of port wine. It may be administered twice or thrice in the course of twenty-four hours. *In cases of acute gastritis, carcinoma of the stomach, obstinate vomiting, &c., where it is necessary to avoid giving food by the mouth.*

Another form may run thus:—Take four or six ounces of restorative soup prepared without any acid (F. 2), one ounce of cream, two teaspoonfuls of brandy, and either fifteen minims of liquid extract of opium, or ten grains of citrate of iron and quinia.

22. *Cod Liver Oil and Bark Enema.*

Take four ounces of milk, one ounce of port wine, half an ounce of cod liver oil, two drachms of tincture of yellow cinchona, and twenty minims of liquid extract of opium. Mix. To be administered every twelve hours.

23. *Quinine and Solution of Beef Enema.*

Take one tablespoonful of brandy, five grains of sulphate of quinia, one teaspoonful of glycerine, two tablespoonfuls of cream, and from four to eight ounces of restorative soup (F. 2); Mix. This enema can be administered every six or eight hours. Where the rectum is very irritable, or it is necessary to relieve pain, from fifteen to twenty minims of the liquid extract of opium may be advantageously added.

In all nutrient enemata LIEBIG'S extract may be advantageously substituted for domestic beef-tea, the solid particles floating in which are not absorbed. When nutritive enemata are required for any length of time the rectum should be occasionally washed out by a copious injection of warm water to prevent irritation by accumulation and decomposition of unabsorbed residuum.

II. ALTERATIVES AND RESOLVENTS.

24. *Compound Pill of Calomel and Opium.*

℞. Pilulæ Hydrargyri Subchloridi Compositæ, gr. 5; Extracti Opii, gr. ½. Make a pill, and direct it to be taken every night or night and morning. *In disorders dependent on a venereal taint.*

25. *Calomel and Opium.*

℞. Hydrargyri Subchloridi, gr. 2; Pulveris Opii, gr. ¼; Confectionis Rosæ Gallicæ, sufficient to make a pill. To be taken every four hours. *As an alterative, when it is wished to get the system quickly under the influence of mercury.*

26. *Mercury and Conium, or Quinine.*

℞. Hydrargyri cum Cretâ, gr. 2; Extracti Conii, gr. 3. Mix, and form a pill to be taken three times a day. *In syphilitic tubercular diseases.*

℞. Hydrargyri cum Cretâ, gr. 1—3; Quiniæ Sulphatis, gr. 1; Extracti Gentianæ, gr. 1. Mix, and form a pill, to be taken three times a day. *A convenient form of administering mercury in secondary syphilis, and little liable to give rise to troublesome salivation.*

27. *Perchloride of Mercury, or Corrosive Sublimate.*

℞. Hydrargyri Perchloridi, gr. 1; Ammonii Chloridi, gr. 5; Extracti Sarsæ Liquidi, fl. drs. 12; Decocti Sarsæ Compositi, ad fl. oz. 12. Mix. Direct,—"Two small tablespoonfuls to be taken three times a day."—*In confirmed constitutional syphilis; as well as in some forms of eczema, prurigo, follicular vaginitis, chronic metritis, &c.*

℞. Hydrargyri Perchloridi, gr. 1; Glycerini, fl. oz. 1; Tincturæ Cinchonæ Compositæ, ad fl. oz. 3; Olei Menthæ Piperitæ, min. 25. Mix. Direct,—"One teaspoonful in a wineglassful of water three times a day." *In constitutional syphilis, some forms of hæmorrhage, and certain varieties of vertigo.*

℞. Hydrargyri Perchloridi, gr. 1; Extracti Opii, gr. 3—6; Guaiaci Resinæ, gr. 100; Glycerini, sufficient to make a mass. Divide carefully into twenty-four pills, and order two to be taken three times a day. *In some varieties of chronic rheumatism, secondary syphilis, and skin diseases.*

28. *Mercury, Squills, and Digitalis.*

℞. Pilulæ Hydrargyri, gr. 3; Digitalis Foliæ, gr. ½; Pulveris Scillæ, gr. 1½. Mix, and form a pill to be taken twice or three times a day. *As an alterative and diuretic, in some cases of dropsy.*

29. *Bromide of Mercury and Sarsaparilla.*

℞. Hydrargyri Bromidi, gr. ½; Extracti Sarsæ Liquidi, fl. drs. 2; Decocti Sarsæ Compositi, fl. drs. 10. Mix. To be taken three times a day. *In syphilitic lepra, and obstinate secondary syphilitic eruptions.*

30. *Podophyllum Peltatum, or May-apple.*

℞. Podophylli Resinæ, gr. ⅙—⅓; Pulveris Ipecacuanhæ, gr. ½; Extracti Gentianæ, gr 3. Mix. Make a pill, to be taken twice or thrice daily. *In syphilis, scrofula, jaundice from suppression, skin diseases, &c. As a simple alterative it is perhaps as valuable as mercury, without possessing any injurious qualities. One or two grains of quinine may be advantageously added to each pill, where there is general debility.* See F. 160.

31. *Iodide of Potassium Mixtures.*

℞. Potassii Iodidi, gr. 20—30; Tincture Serpentariæ, fl. drs. 3; Misturæ Guaiaci, ad fl. oz. 8. Mix. One-sixth part to be taken three times a day. *Valuable in chronic and gonorrhœal rheumatism, in lumbago, some forms of neuralgia, &c.*

℞. Potassii Iodidi, gr. 30; Potassæ Bicarbonatis, gr. 60; Tincturæ Hyoscyami, fl. drs. 3; Infusi Cinchonæ Flavæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In chronic rheumatism with an abundance of lithates in the urine; as well as in some cases of eczema, &c.*

℞. Potassii Iodidi, gr. 2; Vini Colchici, min. 15; Tincturæ Aconiti, min. 3—8; Infusi Rhei, fl. oz. 1. Make a draught, to be taken three times a day. *In acute and suppressed and chronic gout.*

℞. Potassii Iodidi, gr. 3—5; Spiritûs Ammoniæ Aromatici, min. 40; Tincturæ Belladonnæ, min. 5—15; Tincturæ Cinchonæ Compositæ, fl. drm. 1; Aquæ Menthæ Piperitæ, ad fl. oz. 1½. Make a draught. To be taken three times a day. *In some cases of asthma the Author has found remarkable benefit from this formula.*

℞. Potassii Iodidi, gr. 15—30; Vini Colchici, min. 90; Tincturæ Hyoscyami, fl. drs. 6; Magnesiæ Sulphatis, gr. 220; Infusi Anthemidis, ad fl. oz. 8. Mix. One sixth part three times a day. *In some instances of gout with fever and constipation, and in chronic pleurisy with effusion. Also in cases of lead and mercurial poisoning occurring in gouty subjects.*

℞. Potassii Iodidi, gr. 60; Tincturæ Rhei, fl. oz. 1; Extracti Sarsæ Liquidi, fl. oz. 2. Mix. Label,—"A small teaspoonful in a wineglassful of water three times a day." *In syphilitic skin diseases, in nodes, and in follicular inflammation of the pharyngo-laryngeal mucous membrane, &c.*

℞. Potassii Iodidi, gr. 100—400; Ammoniæ Carbonatis, gr. 30; Tincturæ Aurantii, fl. oz. ℥ij. Mix. A teaspoonful to be taken three times a day in a wineglass of water, or with two ounces of Decoction of Sarsaparilla. *In syphilitic disease of the nervous system or severe forms of tertiary syphilis. Large doses of the Iodide of Potassium are better borne after meals.*

℞. Potassii Iodidi, gr. 30—120; Glycerini, fl. oz. 1; Tincturæ Aconiti, min. 20; Vini Ipecacuanhæ, fl. drs. 2; Succi Taraxaci, fl. drs. 6; Decocti Sarsæ Compositi, ad fl. oz. 8. Mix. One sixth part three times a day. *In severe gonorrhœal rheumatism, tertiary syphilis, secondary spreading syphilitic ulcers, bronchocele, scrofulous sores, aneurism, &c.*

℞. Potassii Iodidi, gr. 15; Tincturæ Assafœtidæ, min. 90; Tincturæ Senegæ, fl. drs. 3; Syrupi Mori, ad fl. oz. 3. Mix. Label,—"One teaspoonful every two, three, or four hours." *For a child about two years old, suffering from croup. Also in cases of infantile pneumonia.*

32. *Iodide of Iron Mixtures.*

℞. Ferri Iodidi, gr. 6—18; Glycerini, fl. drs. 12; Infusi Calumbæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In the early stages of tuberculosis, and in strumous ulcers, where the stomach will not tolerate cod liver oil.*

℞. Potassii Iodidi, gr. 30; Ferri et Ammoniæ Citratis, gr. 60; Aquæ Destillatæ, fl. drs. 2; Glycerini, fl. drs. 6; Olei Menthæ Piperitæ, min. 10; Olei Morrhuæ, ad fl. oz. 6. Mix. One tablespoonful after the two chief meals of the day.

℞. Potassii Iodidi, gr. 12; Ferri et Quiniæ Citratis, gr. 30; Tincturæ Aconiti, min. 25; Infusi Chiratæ, fl. oz. 6. Mix. One sixth part three times a day. *In chronic rheumatism with debility, &c.*

℞. Tincturæ Ferri Perchloridi, Tincturæ Iodi, āā min. 10; Aquæ Camphoræ, fl. oz. 1. Make a draught, to be taken three times a day. *Useful in strumous affections of the cervical glands, mesenteric disease, and some cutaneous disorders.*

℞. Syrupi Ferri Iodidi, Extracti Sarsæ Liquidi, āā fl. oz. 1. Mix. Direct.—"One teaspoonful in two tablespoonfuls of water three times a day." *In chronic rheumatism, old-standing venereal affections, &c.*

℞. Potassii Iodidi, gr. 3—8; Ferri et Ammoniæ Citratis, gr. 20; Syrupi Papaveris, fl. drs. 3; Infusi Quassiæ, ad fl. oz. 4. Mix. One tablespoonful three times a day. *For children with tabes mesenterica. Useful also for strumous subjects who have had ascarides.*

33. *Iodide of Potassium and Mercury.*

℞. Ammoniæ Carbonatis, gr. 30; Potassii Iodidi, gr. 20; Tincturæ Aconiti, min. 30; Tincturæ Chloroformi Compositæ, fl. drm. 1; Tincturæ Cinchonæ Flavæ, fl. drs. 6; Aquæ Menthæ Piperitæ, ad fl. oz. 8. Mix. Direct,—"One sixth part three times a day, viz. at 9 am., 2 p.m., and 7 p.m." At the same time,—

℞. Hydrargyri Iodidi Viride, gr. 2; Extracti Opii, gr. 1; Extracti Hyoscyami, gr. 6. Mix, divide into two pills, and order one to be taken every night at 11 o'clock as long as the mixture is continued. *Very useful in many forms of constitutional syphilis, with sleepless nights.*

34. *Mercury and Chalk, with Dover's Powder, &c.*

℞. Hydrargyri cum Cretâ, Pulveris Ipecacuanhæ Compositi, āā gr. 5. Mix, and make a powder to be taken every eight or twelve hours. *In diarrhœa with unhealthy secretions, and in mild dysentery.*

℞. Sodæ Bicarbonatis, Hydrargyri cum Cretâ, āā gr. 2; Magnesiæ Carbonatis, gr. 5. Mix, and make a powder to be taken every other night. *An alterative and aperient for children, where there is great acidity of the secretions.*

℞. Hydrargyri cum Cretâ, gr. 1—2; Pulv. Rhei, Sodæ Bicarbonatis, āā gr. 2—4. Mix, and make a powder to be taken every night or every other night. *An alterative and aperient for children when the stools are pale, or during feverishness attending dentition, &c.*

35. *Cyanide of Mercury.*

℞. Hydrargyri Cyanidi, gr. 1; Extracti Opii, gr. 4; Extracti Conii, gr. 40. Mix thoroughly, divide into sixteen pills, and order one to be taken night and morning. *For long-standing syphilitic eruptions, ulcers, sore throats, &c.* A lotion or gargle can be used at the same time made with six grains of the Cyanide of Mercury to a pint of water or of infusion of linseed.

36. *Tar Pills and Capsules.*

℞. Picis Liquidæ, oz. 1; Pulveris Aromatici, oz. ½. Mix, divide into five-grain pills, and order two or three to be taken three times a day.

TAR CAPSULES are made, each containing about six grains of tar. Two or three may be taken for each dose, thrice daily. *In some chronic skin diseases, eczema, pruritus of the anus, and chronic catarrhal affections.*

37. *Bromide of Ammonium.*

℞. Ammonii Bromidi, gr. 12—60; Infusi Aurantii, fl. oz. 8. Mix. Direct,—"One sixth part to be taken three times a day, an hour before meals." *Recommended by* Sir G. D. Gibb *for diseases in which the nervous system is functionally involved,—as epilepsy, &c. It is a valuable absorbent in glandular enlargements, and in excessive corpulency; while it has also a peculiar soothing influence upon the mucous membranes.*

℞. Ammonii Bromidi, gr. 24; Aquæ, fl. oz. 2. Mix. One teaspoonful in a small cup of sweetened tea three times a day. *For an infant with hooping cough.*

38. *Iodide of Ammonium.*

℞. Ammonii Iodidi, gr. 3—15; Infusi Cinchonæ Flavæ, fl. oz. 1—2. Make a draught. To be taken twice or thrice daily before food. *Very valuable in strumous enlargement of the absorbent glands. The dose is to be graduated according to the patient's age. At the time this medicine is given internally, an ointment of the iodide of ammonium* (gr. 60 to lard oz. 1) *should be rubbed into the swellings night and morning.*

39. *Iodide of Sodium.*

℞. Sodii Iodidi, gr. 60; Decocti Sarsæ Compositi, fl. oz. 8. Mix. One sixth part three times a day. *As an antisyphilitic where the iodide of potassium disagrees. Moreover, it will sometimes effect a cure after the latter has failed to be of use.*

40. *Benzoate of Ammonia.*

℞. Ammoniæ Benzoatis, gr. 10—20; Syrupi Aurantii Floris, fl. drm. 1; Aquæ, ad fl. drs. 12. Mix for a draught, to be taken three times a day. *In chronic bronchitis, hepatic congestion with deficient urine, chronic inflammation of the bladder with alkaline urine, and in cases attended with the copious excretion of phosphates.*

41. *Creasote.*

℞. Creasoti, min. 20—40; Pulveris Aromatici, gr. 80; Mucilaginis Acaciæ, sufficient to form a mass. Divide into twenty pills, and order one or two to be taken three times a day. *In some forms of neuralgia, chronic bronchitis, and obstinate vomiting unconnected with inflammation or organic disease—such as sea-sickness. After taking creasote for a short time, the urine occasionally assumes a dirty or brownish-black colour. Inunction with tar may give rise to the same effect. Under these circumstances, creasote has been obtained from the urine by distillation.*

In the officinal Mistura Creasoti the unpleasant flavour is tolerably well disguised by the Spirit of Juniper. Dose of the mixture, fl. oz. 1—2. See F. 90.

42. *Bromide of Potassium.*

℞. Potassii Bromidi, gr. 20—40; Aquæ Camphoræ, fl. oz. 3. Mix for a draught, to be taken every night at bedtime. *For insomnia without any apparent cause, epileptic and epileptoid seizures, paroxysmal vertigo and headache, &c.*

℞. Potassii Bromidi, gr. 60—90; Potassii Iodidi, gr. 12; Potassæ Bicarbonatis, gr. 40; Tincturæ Aurantii, fl. drs. 6; Infusi Aurantii Compositi, ad fl. oz. 8. Mix. One sixth part, on an empty stomach, night and morning. *The favourite remedy for epilepsy* (1865).

℞. Potassii Bromidi, gr. 30—60; Tincturæ Valerianæ Ammoniatæ, fl. drs. 6; Aquæ Camphoræ, *vel* Infusi Chiratæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In hysteria, insomnia due to nervous irritability, functional disturbance of the uterine functions, spermatorrhœa from bad habits, &c.*

℞. Pulveris Guaiaci, gr. 40; Potassii Bromidi, gr. 30; Magnesiæ Carbonatis, gr. 60. Mix. Divide into six powders, and order one to be taken three times a day in a little mucilage, or cream, or honey. *Useful in cases where it is required to exert a sedative action on the sexual organs.*

43. *Guaiacum Mixtures.*

℞. Tincturæ Guaiaci Ammoniatæ, fl. drs. 4; Tincturæ Aconiti, min. 30; Mucilaginis Tragacanthæ, Aqua Cinnamomi, āā fl. oz. 4. Mix. Two tablespoonfuls twice or three times a day. *In the chronic rheumatism of old and weak people. Also in some skin diseases where there is a strumous taint.*

℞. Extracti Opii Liquidi, min. 30; Tincturæ Quiniæ, fl. drs. 6; Misturæ Guaiaci, ad fl. oz. 8. Mix. One sixth part three times a day. *In chronic skin diseases. Guaiacum has also been highly extolled in tonsillitis.*

℞. Sulphuris Sublimati, oz. 2; Potassæ Tartratis Acidæ, oz. 1; Pulveris Rhei, gr. 120; Guaiaci Resinæ, gr. 60; Mellis, lb. 1; Myristicæ, unum in pulverem redacti. Mix thoroughly, and order two teaspoonfuls to be taken night and morning until the whole is consumed. *This compound was formerly in much repute for the cure of chronic rheumatism; being said to be especially useful in old-standing cases, when the skin is inactive and the intestinal glands, &c., torpid. It was well known under the name of the "Chelsea Pensioner."*

℞. Tincturæ Nucis Vomicæ, min. 95; Extracti Cinchonæ Flavæ Liquidi, min. 80; Misturæ Guaiaci, fl. oz. 12. Mix. One-eighth part twice a day. *In habitual constipation from a sluggish condition of the intestinal walls.*

44. *Quinine and Ipecacuanha, or Belladonna.*

℞. Quiniæ Sulphatis, gr. 8; Pulveris Ipecacuanhæ, gr. 24; Pulveris Ipecacuanhæ Compositi, gr. 30; Glycirini, sufficient to form a mass. Divide into sixteen pills, and order two to be taken every three or four hours. *In subacute dysentery, occurring in tropical regions.* See F. 384.

℞. Quiniæ Sulphatis, gr. 2; Extracti Belladonnæ, gr. $\frac{1}{3}$; Extracti Opii, gr. $\frac{1}{2}$—1; Extracti Hyoscyami, gr. 2. Make a pill to be taken every six or eight hours. *In neuralgia, severe pruritus of the vulva, carcinoma, &c.* See F. 383.

45. *Chloride of Calcium, &c.*

℞. Calcii Chloridi, gr. 200; Tincturæ Belladonnæ, fl. drs. 4; Tincturæ Aurantii, fl. drs. 12; Aquæ, fl. oz. 1. Mix and label,—"One teaspoonful in a wineglassful of water three times a day,—at 10 a.m., 4 p.m., and bedtime."—*In fibroid tumours of the uterus, when they are painful or cause much sense of weight and backache. Also, in bronchocele, enlargement of cervical glands, scrofula, &c.*

℞. Calcii Chloridi, gr. 300; Succi Conii, fl. oz. 3; Glycerini puri *vel* Tincturæ, Cardamomi Compositæ, fl. oz. 1. Mix and label,—"One teaspoonful in a wineglassful of water three times a day."

46. *Colchicum, &c.*

℞. Hydrargyri Subchloridi, Extracti Colchici Acetici, Extracti Aloes Barbadensis, Pulveris Ipecacuanhæ, āā gr. 1. Make a pill, to be taken every four hours until the bowels are well acted upon. *In gout, with congestion of the liver.*

℞. Extracti Colchici Acetici, Extracti Aconiti, āā gr. 1; Pilulæ Hydrargyri, gr. 3. Make a pill, to be taken every night at bedtime. *In gout, with deficient action of the liver.*

℞. Potassæ Citratis, gr. 120; Vini Colchici, fl. drs. 1—2; Liquoris Morphiæ Hydrochloratis, fl. drm. 1; Aquæ Camphoræ, ad fl. oz. 8. Mix. One-sixth part every six hours. *In some forms of gout, where there is great restlessness with but little constitutional depression.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. 6; Vini Colchici, fl. drs. 2—4; Tincturæ Aurantii, ad fl. oz. 2. Mix. Direct,—"One teaspoonful in half a bottle of soda water, three times a day."

47. *Oxide of Silver.*

℞. Argenti Oxidi, gr. 1—2; Pulveris Aromatici, gr. 2; Extracti Cannabis Indicæ, gr. ½; Glycerini, sufficient to make a pill. To be taken three times a day. *Of doubtful efficacy in dyspepsia, pyrosis, hæmoptysis, menorrhagia, diarrhœa, &c.* One third of a grain of Extract of Opium can be added to each pill, if needed.

48. *Sulphurous Acid.*

℞. Acidi Sulphurosi, min. 30—fl. drm. 1; Aquæ, ad fl. oz. 2. Mix for a draught, to be taken every two or three or four hours. *In ichorhæmia, diphtheria, malignant scarlet fever, typhus, &c.*

℞. Sodæ Sulphitis, gr. 30—60; Infusi Quassiæ, fl. oz. 1½. Mix, and make a draught to be taken three times a day. SIR WILLIAM JENNER.—*In diseases of the stomach, accompanied by the formation of the sarcinæ ventriculi. The patient should eat unfermented bread while taking this medicine.*

The SULPHITE OF MAGNESIA may be given in doses varying from 20 to 40 grains, dissolved in one or two ounces of water, every two or three or four hours, with the object of neutralizing blood poisons. It is richer in sulphurous acid than the sulphite of soda, is more stable, and has a much more agreeable taste. This salt has been strongly recommended by DR. POLLI, of Milan, in cases of pyæmia, typhus, puerperal fever, hospital gangrene, dissecting wounds, glanders, cholera, &c.

49. *Benzoic Acid.*

℞. Acidi Benzoici, gr. 3—20; Glycerini, sufficient to form one or more pills. *Administered in proper doses, three or four times a day, this remedy is useful in jaundice from suppressed action of the liver and uræmia. It has also been recommended in some cases of incontinence of urine in children.* See F. 246.

50. *Turpentine Mixtures.*

℞. Olei Terebinthinæ, fl. oz. 1; Vitelli Unius Ovi; beat together and add gradually Misturæ Amygdalæ, fl. oz. 4; Syrupi Aurantii, fl. oz. 2; Tincturæ Lavandulæ Compositæ, fl. drs. 4; Olei Cinnamomi, guttæ 4. Mix. Two tablespoonfuls to be taken three times a day. CARMICHAEL.—*Recommended in iritis, where the use of mercury is contra-indicated.*

℞. Spiritûs Ætheris, fl. drs. 2; Olei Terebinthinæ, fl. drs. 1½; Mucilaginis Acaciæ, fl. oz. 3; Aquæ Cinnamomi, ad fl. oz. 6. Mix. Direct,—"One-sixth part three times a day." *To prevent the formation of gall-stones, or to aid in dissolving them. The utility of this mixture is doubtful.*

℞. Olei Terebinthinæ, fl. drs. 1½—3; Syrupi Limonis, fl. drs. 6; Mucilaginis Tragacanthæ, fl. oz. 3; Aquæ, ad fl. oz. 6. Mix. Direct,—"One-sixth part every four or six hours." *Useful in some forms of hæmatemesis, hæmoptysis, epistaxis, purpura hæmorrhagica, &c. Its effects must be watched, so that it may be discontinued directly any unpleasant results—such as strangury or severe vomiting—arise.—If the symptoms are very urgent the first dose of the turpentine may consist of* fl. drs. 4—6, *beaten up with mucilage; the succeeding doses being according to the formula. In some cases the turpentine may be advantageously given with gallic acid, or the tincture* *of the perchloride of iron, or with the acid infusion of roses, or with the dilute nitric acid. A drop of creasote with each dose materially lessens its tendency to cause nausea.*

℞. Terebinthinæ Chiæ, gr. 2; Pulveris Rhei, gr. 3; Saponis duri, sufficient to make a pill. To be taken twice a day. See F. 102.

51. *Donovan's Triple Solution.*

℞. Liquoris Hydriodatis Arsenici et Hydrargyri, min. 20—30; Tincturæ Zingiberis, fl. drm. 1; Aquæ, fl. oz. 1. Make a draught, to be taken twice a day, directly after meals. *Useful in secondary syphilis, psoriasis, &c.*

52. *Arsenical Mixtures.*

℞. Liquoris Arsenicalis, min. 3; Tincturæ Lupuli, min. 30; Infusi Quassiæ, fl. oz. 1. Make a draught, to be taken three times a day, directly after meals. *Very useful in many obstinate cutaneous diseases. In ague the quantity of arsenic must be trebled. Under any circumstances, the dose should be diminished directly the tongue gets thoroughly coated with a silvery-looking fur, or the conjunctivæ become irritable, or diarrhœa sets in, or gastric pain is complained of.*

℞. Liquoris Sodæ Arseniatis, min. 3—5; Vini Colchici, min. 10; Tincturæ Cinchonæ Compositæ, fl. drm. 1; Tincturæ Aconiti, min. 5; Aquæ, ad fl. oz. 1. Mix. To be taken three times a day, directly after meals. *In some forms of chronic rheumatism, &c.*

℞. Quiniæ Sulphatis, gr. 20; Liquoris Arsenici Hydrochlorici, min. 90—130; Acidi Sulphurici Aromatici, fl. drs. 2; Syrupi Zingiberis, ad fl. oz. 3. Mix. Label, —"One teaspoonful in two tablespoonfuls of water directly after breakfast, dinner, and tea."—*In severe neuralgia, chorea, chronic rheumatism, asthma, hay fever, and intermittent fever.* See F. 381, 399.

℞. Liquoris Arsenicalis, min. 30; Tincturæ Cantharidis, fl. drm. 1; Tincturæ Aurantii, fl. drs. 6; Potassii Iodidi, gr. 18—30; Infusi Aurantii, ad fl. oz. 6. Mix. One-sixth part directly after the two chief meals. *Valuable in some inveterate cutaneous diseases, as lupus, eczema, psoriasis, &c.*

℞. Liquoris Sodæ Arseniatis, fl. drs. 1½; Succi Scoparii, fl. oz. 3. Mix. One teaspoonful three times a day, in a wineglassful of water. *In some cases of dropsy from chronic renal disease.*

℞. Acidi Arseniosi, gr. 1; Pulveris Zingiberis, gr. 40; Extracti Jalapæ, gr. 20; Pulveris Tragacanthæ Compositi, gr. 30; Confectionis Rosæ Caninæ, gr. 10. Mix very intimately, divide into twenty pills, and order one to be taken three times a day, immediately after meals. *In psoriasis, chronic eczema, and other cases where it is desirable to administer arsenic in a solid form.*

53. *Green Iodide of Mercury.*

℞. Hydrargyri Iodidi Viride, gr. 12; Extracti Lupuli, gr. 60; Extracti Opii, gr. 2—5. Mix. Divide into twenty-four pills, silver them, and order one to be taken three or four times in the day.—*The green iodide of mercury* (Syn. IODIDE OF MERCURY, Hg I) *will cure some of the pustular and tubercular diseases of the skin, as well as certain secondary venereal ulcerations, when all other means fail.* See F. 33.

℞. Hydrargyri Iodidi Viride, gr. 6; Extracti Conii, gr. 30. Mix. Divide into six pills, and order one to be taken every night at bedtime. *In small secondary syphilitic ulcers about the tongue.*

54. *Red Iodide of Mercury.*

℞. Hydrargyri Iodidi Rubri, gr. 1—2; Morphiæ Hydrochloratis, gr. 1; Extracti Gentianæ, *vel* Extracti Conii, gr. 40. Mix. Divide into twelve pills, and order one to be taken twice a day. Four or six ounces of the Compound Decoction of Sarsaparilla may be taken with each pill, or an ounce of the Guaiac Mixture. *Useful in the same cases as demand the green iodide of Mercury. The red iodide* (Syn. BINIODIDE OF MERCURY, $Hg\ I_2$) *is, however, less likely to cause gastric irritation.*

℞. Hydrargyri Perchloridi, gr. 1; Ammonii Chloridi, gr. 30; Potassii Iodidi, gr. 40; Extracti Sarsæ Liquidi, fl. oz. 4; Decocti Sarsæ, ad fl. oz. 8. Mix and label,—"One small tablespoonful (or one-sixteenth part) in a wineglassful of water three times a day."—*This formula gives a convenient extemporaneous mode of exhibiting the red iodide of mercury in a fluid form.*

℞. Hydrargyri Iodidi Rubri, gr. 3; Potassii Iodidi, gr. 60—120; Spiritûs Vini Rectificati, fl. drm. 1; Syrupi Zingiberis, fl. drs. 4; Aquæ Destillatæ, fl. drs. 12. Mix. Label,—"Thirty drops three times a day in a wineglassful of water." MR. LANGSTON PARKER *says—and the Author can confirm the remark—that this remedy, used in conjunction with the mercurial vapour bath, produces excellent results in some obstinate forms of tubercular disease of the skin; as well as in secondary venereal ulcerations, proving intractable after the employment of other remedies.*

55. *Red Iodide of Mercury and Arsenic.*

℞. Hydrargyri Iodidi Rubri, gr. 1; Potassii Iodidi, gr. 120; Liquoris Arsenicalis, fl. drs. 1½; Tincturæ Lavandulæ Compositæ, fl. oz. 2; Spiritûs Chloroformi, fl. drs. 4; Aquæ, ad fl. oz. 12. Mix; and direct,—"One tablespoonful to be taken three times a day, immediately after food."—*In psoriasis, and some inveterate squamous and tubercular and ulcerous affections of the skin.*

56. *Puccoon and Iodide of Arsenic.*

℞. Sanguinariæ Canadensis, gr. 12; Arsenici Iodidi, gr. 2; Extracti Conii, gr. 40. Mix carefully, divide into twenty-four pills, and order one to be taken three times a day. *Said to be beneficial in cases of cancer.*

57. *Chloride of Bromium.*

℞. Bromidi Chloridi, guttæ 3—4; Pulveris Glycyrrhizæ, gr. 60. Mix intimately, and divide into twenty pills. One to be taken twice or thrice daily. *Recommended by* LANDOLFI *in cancer.*

58. *Bael and Spirit of Chloroform.*

℞. Extracti Belæ Liquidi, fl. oz. 2; Spiritûs Chloroformi, fl. oz. 1. Mix. Direct, —"One teaspoonful in a cup of barley water three or four times a day."—*Has been found useful in diarrhœa and dysentery.*

59. *Nitrate of Silver.*

℞. Argenti Nitratis, gr. 1; Extracti Hyoscyami, gr. 3. Make a pill. To be taken every twelve hours, on an empty stomach, for about ten days. *In cases of idiopathic jaundice dependent upon gastro-duodenal disturbance rather than on disease of the liver.*

℞. Argenti Nitratis, gr. 3—12; Micæ panis, gr. 30. Divide into twelve pills, and order one to be taken three times a day. *In progressive locomotor ataxy, &c.* See F. 419. The gums should be watched, as the gingival mucous membrane becomes discoloured before the skin is affected. There is consequently time to prevent the latter by discontinuing the silver salt.

60. *Chloride of Ammonium.*

℞. Ammonii Chloridi, gr. 80—160; Syrupi Hemidesmi, fl. oz. 1; Infusi Gentianæ Compositi, ad fl. oz. 8. Mix. Two tablespoonfuls every six hours. *In some forms of chronic rheumatism, chronic bronchitis, pleurodynia, myalgia, neuralgia, &c.*

℞. Liquoris Ammoniæ Acetatis, fl. drs. 2—4; Ammonii Chloridi, gr. 15; Infusi Dulcamaræ, fl. oz. 2. Make a draught to be taken every four hours. *In some varieties of rheumatism, phlegmasia dolens, thrombosis, &c., where the fibrin of the blood is in excess.* The efficacy of this remedy is increased by giving 120 or 200 grains of the Acid Tartrate of Potash (Syn. BITARTRATE OF POTASH) in half a pint of water, early in the morning.

℞. Ammonii Chloridi, gr. 20; Extracti Taraxaci, gr. 15; Tincturæ Gentianæ Compositæ, fl. dr. 1; Infusi Sennæ, ad fl. oz. 2. Make a draught, to be taken twice or thrice daily. *In some cases of ascites dependent on cirrhosis, in jaundice, in diminished secretion of bile, &c.*

61. *Chlorate of Potash.*

℞. Potassæ Chloratis, gr. 120; Aquæ Camphoræ, *vel* Infusi Cinchonæ Flavæ, fl. oz. 8. Mix. One-sixth part every four or six hours, with two tablespoonfuls of water. *In inflammatory affections of the mouth, &c.*

℞. Potassæ Chloratis, gr. 90; Spiritûs Ætheris, fl. drs. 3; Infusi Chiratæ, ad fl. oz. 4. Direct,—"One tablespoonful in a wineglassful of water three times a day." *In tonsillitis, glossitis, &c.*

℞. Potassæ Chloratis, gr. 120. Label—"This powder to be dissolved in one or two pints of lemonade, or of barley water, to form a day's drink." *In cases of aphthæ, fever, blood-poisoning, sloughing of any of the tissues, ovarian disease, &c.*

III. ANTACIDS.

62. *Carbonate of Magnesia.*

℞. Magnesiæ Carbonatis, gr. 80; Extracti Opii Liquidi, min. 30; Spiritûs Ætheris, fl. drs. 3; Aquæ Menthæ Viridis, ad fl. oz. 6. Mix. One-fourth part occasionally. *Useful where there is much oppression from flatulence.*

℞. Magnesiæ Carbonatis, Sodæ Bicarbonatis, āā gr. 15; Infusi Serpentariæ, fl. drs. 12. Make a draught, to be taken twice or thrice daily. *In chronic urticaria.*

63. *Ammonia and Chiretta.*

℞. Ammoniæ Carbonatis, gr. 5; Tincturæ Aurantii, fl. drm. 1; Infusi Chiratæ, fl. oz. 1; Aquæ, ad fl. oz. 2. Make a draught, to be taken night and morning. *A good remedy in dyspepsia, with acid eructations and debility.*

64. *Preparations of Lithia.*

℞. Lithiæ Carbonatis, gr. 3—6; Aquæ, fl. oz. 3. Make a draught to be taken twice a day. DR. GARROD *speaks highly of this remedy in cases of the uric acid diathesis and in chronic gout. Where uric acid gravel is being voided, it causes a marked improvement. The carbonate of lithia exists in many of the continental springs—as those of Carlsbad, Marienbad, Kreuznach, Aix-la-Chapelle, Kissingen, Ems, Vichy, Baden-Baden, &c.*

℞. Lithiæ Citratis, gr. 60; Aquæ Destillatæ, fl. drs. 10; Tincturæ Cardamomi Compositæ, fl. drs. 2. Mix and label,—"One teaspoonful in a tumblerful of soda water every morning before breakfast." *In the gouty diathesis. To ward off attacks.*

℞. Lithiæ Citratis, Magnesiæ Carbonatis, āā gr. 10. Make a powder to be taken twice daily. *In chronic gout.*

65. *Bismuth, with Magnesia or Soda.*

℞. Bismuthi Carbonatis, Magnesiæ Carbonatis, āā gr. 10. Make a powder to be taken in half a bottle of soda water three times a day.

℞. Bismuthi Subnitratis, gr. 15; Sodæ Bicarbonatis, gr. 12; Pulveris Tragacanthæ Compositi, gr. 60. Make a powder, to be taken twice or thrice in the twenty-four hours, in a wineglassful of brandy and water.

℞. Liquoris Bismuthi et Ammoniæ Citratis, fl. drm. 1; Infusi Quassiæ, fl. oz. 1. Make a draught to be taken three times a day. One drachm of the solution of bismuth is equal to twenty grains of the powder. *These preparations are very useful in pyrosis, gastrodynia, acid eructations, nausea and sickness, and many diseases of the stomach, cæcum, &c.* See also F. 112.

℞. Bismuthi Subnitratis, gr. 720; Magnesiæ Carbonatis, oz. 2; Calcis Carbonatis Præcipitati, oz. 3; Sodæ Bicarbonatis, gr. 1800; Sacchari Albi, oz. 14; Acaciæ Gummi, gr. 220; Mucilaginis Acaciæ, fl. oz. 1; Aquæ Rosæ, sufficient to make a mass. Divide into 360 lozenges, and dry them with a moderate heat.

Each lozenge contains two grains of subnitrate of bismuth, two and a half grains of magnesia, and five grains of bicarbonate of soda. From one to six lozenges may be taken for dose. These lozenges, under the name of *Trochisci Sodæ Bicarbonatis c. Bismuthum*, have been prepared for the Author by Mr. Cooper, 26, Oxford Street, London. They check heartburn and acrid eructations better than the officinal bismuth lozenges.

66. *Chalk Mixture and Hops.*

℞. Tincturæ Lupuli, fl. drs. 6; Tincturæ Cardamomi Compositæ, fl. drs. 4; Vini Ipecacuanhæ, fl. drs. 2; Extracti Opii Liquidi, min. 25; Misturæ Cretæ, ad fl. oz. 6. Mix. One tablespoonful every three or four hours. *In diarrhœa due to acidity of the primæ viæ.*

67. *Potash and Ammonia.*

℞. Potassæ Bicarbonatis, gr. 120; Spiritûs Ammoniæ Aromatici, fl. drs. 3; Tincturæ Aconiti, min. 30; Infusi Lupuli, ad fl. oz. 8. Mix. One-sixth part three times a day. *In gastrodynia.*

68. *Ammonia, Potash, and Bark.*

℞. Ammoniæ Carbonatis, gr. 30; Potassæ Chloratis, gr. 90; Extracti Opii Liquidi, min. 30; Decocti Cinchonæ Flavæ, fl. oz. 8. Mix. One-sixth part three times a day. *In debility with acid secretions.*

69. *Solution of Potash and Buchu.*

℞. Liquoris Potassæ, min. 10—15; Tincturæ Hyoscyami, min. 40; Infusi Buchu, fl. drs. 12. Make a draught to be taken three times a day. *In catarrh and irritability of the bladder.*

70. *Soda, Morphia, and Dilute Hydrocyanic Acid.*

℞. Sodæ Bicarbonatis, gr. 15; Liquoris Morphiæ Hydrochloratis, min. 15; Acidi Hydrocyanici Diluti, min. 5; Infusi Cascarillæ, fl. oz. 1. Make a draught, to be taken immediately. *In gastrodynia, &c., after the stomach has been emptied by an emetic. In angina pectoris, immediately after a paroxysm.*

71. *Potash and Aloes.*

℞. Potassæ Bicarbonatis, oz. ½; Tincturæ Chiratæ, fl. drs. 2; Decocti Aloes Compositi, fl. oz. 8. Mix. Take one-sixth part early every morning. *In chronic gout.*

72. *Bicarbonate of Potash.*

℞. Potassæ Bicarbonatis, gr. 30; Aquæ, fl. oz. 2. Make a draught to be taken every two hours. *In acute rheumatism. This medicine to be continued until the joints are free from pain. It generally renders the urine alkaline in twenty four hours.*

73. *Potash and Lime Water.*

℞. Liquoris Potassæ, min. 15—45; Liquoris Calcis Saccharati, min. 20—60. Mix. To be taken in a cupful of beef tea, or of milk, two or three times a day. See F. 14.

IV. ANTISEPTICS.

74. *Disinfectants or Deodorants.*

The most useful agents are—chloride of lime, quick lime, the carbolates of lime and magnesia, and permanganate of potash. In certain cases the perchloride of iron, sulphate of iron, ammonia, iodine, bromine, nitrate of lead, and chloride of zinc are applicable; or chlorine gas; or sulphurous acid gas (obtained by sprinkling powdered sulphur on a few bright red coals in a shovel, or by burning part of a stick of sulphur in a crucible or in a pipkin), may be employed; or powdered charcoal, or dry earth, can be tried.

No nightstools or bedpans should be used, especially in hospitals, without their containing the solution of permanganate of potash, or some chloride of lime, or chloride of zinc, or carbolic acid, or half an ounce of tincture of iodine. The first agent has the advantage of not being corrosive; but the last is one of the most efficacious.—To remove quickly any unpleasant smell from the sick room, dried lavender or cascarilla bark may be burnt; while the door and window must be opened, so as to allow of a free current of pure air.

To disinfect linen and washing apparel they should be soaked in a mixture of two ounces of the solution of permanganate of potash to the gallon of water; being afterwards put into boiling water. Woollens, bedding, or clothing may be thoroughly purified by exposing them for about two hours, in an oven, to a temperature of 220° F.

75. *Chlorine Gas.*

As a fumigating agent, antiseptic, and disinfectant chlorine stands unrivalled. The ingredients for producing it should be contained in saucers placed in the higher parts of the room, as the gas which is developed will descend by its density, and soon become mixed with the surrounding air. DR. FARADAY adopted the following method at the Millbank Penitentiary :—One part of common salt was intimately mixed with one part of the black or binoxide of manganese, and placed in a shallow earthen pan ; two parts of oil of vitriol previously diluted with two parts by measure of water, were then poured over it, and the whole stirred with a stick. Chlorine continued to be liberated from this mixture for four days.

Another plan for causing the free evolution of chlorine gas is the addition of half a pint of hydrochloric acid, mixed with a quarter of a pint of water, to a quarter of a pound of finely powdered black oxide of manganese. Or the gas may be generated by dropping a few grains of chlorate of potash, every now and then, into a glass containing some strong hydrochloric acid. Whichever mode is adopted for producing this disinfectant, it is necessary while employing it that the doors, windows, and chimney of the room be kept carefully closed for some hours.

The Chlorides of Lime and Soda, when exposed to the air, gradually absorb carbonic acid and give off chloride. Hence either of these salts can be used as disinfecting agents. Cloths, dipped in an aqueous solution of chloride of lime, may be hung up in an inhabited room to fumigate it; the quantity of chlorine given off being too small to be mischievous. It was probably in reference to these salts, that ABERNETHY said of disinfectants,—" they are sometimes very useful, very useful indeed ; for they make such an abominable stink that the patient is obliged to have the windows opened."

76. *Solution of Chlorinated Soda.*

℞. Liquoris Sodæ Chloratæ, min. 40—120 ; Extracti Opii Liquidi, min. 30 ; Aquæ Camphoræ, ad fl. oz. 8. Mix. Two tablespoonfuls three times a day. *In gangrene of the lung, low fever, &c. It not only relieves the fetor, but acts as an alterative, &c. If necessary, the opium can be omitted.*

77. *To prepare Chlorine for Internal Administration.*

Put sixty grains of finely powdered chlorate of potash in a strong pint bottle, and pour upon them two drachms of strong hydrochloric acid. Close the mouth of the bottle until the violent action ceases, when gently add one ounce of water, and agitate well ; add another ounce, again shake. and continue this process until the bottle is full. Afterwards keep the bottle in the dark. The mixture is to be made fresh every day. One or two tablespoonfuls may be taken frequently according to the age. An adult may use the whole pint in the twenty four hours.

The dose of the officinal LIQUOR CHLORI is from min. 30 to fl. drs. 2 in a wineglassful of water, several times daily. *Useful in scarlet fever, typhus, diphtheria, chronic affections of the liver, &c.*

78. *Permanganate of Potash.*

The permanganate of potash is an excellent disinfectant, and is the basis of CONDY'S Antiseptic Fluid. The latter is double the strength of the officinal LIQUOR POTASSÆ PERMANGANATIS.

From fl. drs. 1—6 of the solution of permanganate of potash in one pint of water, may be applied to all kinds of suppurating sores. The Author has frequently ordered such a lotion with great benefit to destroy the horribly offensive odour of a malignant ulcer ; or for the same purpose in suppurating scalds and burns. The solution should be made only of such a strength, as to be borne without any pain or even uneasiness. It must be frequently syringed over the sores, since contact with lint and sponges decomposes it. Linen is stained by it, but the discoloration may be removed by sulphate of iron. As a wash for stinking feet, or for the removal of offensive odours from the hands after handling morbid specimens, &c., the liquor ought to be used in the proportion of one fluid drachm to the ounce of distilled water. As an injection in cancer of the uterus, the strength ought not to be greater than half a fluid ounce to one pint of water. To deprive nightchairs of offensive odour, a wineglassful of CONDY'S fluid should be mixed with two pints of fresh or salt water, and put into the pan previous to its use.

79. *Chloride of Zinc.*

This substance is a most powerful caustic, which has long been used to destroy cancerous and other growths. It has been administered internally—dose, gr. 1, largely diluted—but without any benefit. It forms, however, a valuable disinfectant gargle—gr. 10 to water fl. oz. 8 ; or in still larger proportions it is a most efficacious antiseptic. SIR W. BURNETT'S Disinfecting Fluid consists of gr. 25 of this salt to water fl. drm. 1. For use, about one ounce of this solution is added to two pints of water. To disinfect a sick room, a piece of flannel three or four feet square is to be moistened with a solution thus made, and frequently waved through the air. Some of it should also be placed in the close-stools and bedpans.

80. *Chlorinated Lime Lozenges.*

℞. Calcis Chloratæ, gr. 60 ; Sacchari Albi, oz. 4 ; Amyli, oz. 1 ; Olei Menthæ Piperitæ, fl. drm. 1 ; Pulveris Tragacanthæ Compositi, gr. 120 ; Aquæ Menthæ Piperitæ, sufficient to form a mass. To be divided into lozenges of twenty grains each. *One may be taken frequently to remove fetor of the breath, whether due to mercury or other causes. The officinal* TROCHISCI POTASSÆ CHLORATIS *can also be used for the same purpose.*

81. *Iodine.*

This agent has been recommended for disinfecting and deodorizing purposes by WYNN WILLIAMS, CAMPBELL DE MORGAN, NUNN, and RICHARDSON. Two hundred grains are placed in a common chip box and suspended over the patient's bed, or they may be put into a cup or saucer on the mantelshelf. If desired, the metal may be at once volatilized and the vapour diffused through the apartment, by placing it on a heated fire-shovel or saucer, since the iodine attacks iron. In rooms occupied by small-pox patients the air may be kept free from smell by using iodine in this manner,—probably the strongest proof which could be adduced of the value of this simple and manageable remedy.

℞. Tincturæ Iodi, fl. drs. 6 ; Aquæ Destillatæ, ad fl. oz. 8. Mix. *Useful as a lotion to unhealthy ulcerations with offensive discharges.*

82. *Extract of Logwood.*

℞. Extracti Hæmatoxyli, oz. 1 ; Olei Theobromæ, Adipis Benzoati, āā oz. ½. Mix. *This is an excellent disinfectant when applied to malignant sores or suppurating wounds. The remedy is equally efficacious when used as a lotion or powder. If any hæmostatic be needed, the logwood may be combined with tannin or perchloride of iron.*

83. *Sulphurous Acid and Quinine.*

℞. Acidi Sulphurosi, fl. drs. 6 ; Tincturæ Aurantii, fl. oz. 1 ; Tincturæ Chloroformi Compositæ, min. 90 ; Quiniæ Sulphatis, gr. 12—18 ; Aquæ ad fl. oz. 6. Mix and label,—"One-sixth part, with two tablespoonfuls of water, every six or eight hours." *In pyæmia, erysipelas, glanders, typhus, dissecting wounds, &c.*

84. *Lavender and Camphor.*

℞. Spiritûs Camphoræ, min. 20; Spiritûs Lavandulæ, fl. drm. 1; Mucilaginis Tragacanthæ, fl. drs. 7. Make a draught. *To be taken every six or eight hours by a nervous attendant in a sick room. Its efficacy may be increased by the occasional addition of a glass of port wine.*

V. ANTISPASMODICS.

85. *Ether Mixtures.*

℞. Spiritûs Ætheris, min. 40—fl. drm. 1; Extracti Opii Liquidi, min. 10—15; Tincturæ Castorei, fl. drm. 1; Aquæ Menthæ Piperitæ, ad fl. drs. 12. Make a draught. *To be taken occasionally (especially at bedtime) when there are paroxysms of pain from structural disease.*

℞. Spiritûs Ætheris, Spiritûs Chloroformi, āā fl. drs. 3; Tincturæ Cardamomi Compositæ, fl. drs. 6; Spiritûs Myristicæ, fl. drs. 2; Olei Carui, min. 12; Mucilaginis Tragacanthæ, fl. oz. 3; Aquæ Menthæ Piperitæ, ad fl. oz. 8. Mix. Two or three tablespoonfuls occasionally, when there is great oppression from flatulence.

℞. Spiritûs Ætheris, min. 90; Spiritûs Ammoniæ Aromatici, fl. drs. 2; Tincturæ Belladonnæ, min. 30; Tincturæ Cantharidis, min. 80; Tincturæ Chloroformi Compositæ, min. 40; Aquæ Camphoræ, ad fl. oz. 4. Mix. Label,—"Two tablespoonfuls every half-hour until the pain is relieved." *In spasmodic diseases, angina pectoris, &c.*

86. *Ammonia Mixtures.*

℞. Spiritûs Ammoniæ Aromatici, fl. drm. 1; Acidi Hydrocyanici Diluti, min. 3—5; Syrupi Zingiberis, fl. drm. 1; Aquæ Carui, ad fl. drs. 12. Make a draught, to be taken twice or thrice a day if there be flatulence or languor. *In dyspepsia, or debility with irritable stomach.* See F. 67, 68.

℞. Tincturæ Assafœtidæ, fl. drs. 2; Ammoniæ Carbonatis, gr. 20; Aquæ Camphoræ, ad fl. oz. 4. Mix. One or two tablespoonfuls occasionally, when the patient is feeling languid or hysterical.

℞. Spiritûs Ammoniæ Aromatici, min. 30; Magnesiæ Carbonatis, gr. 20; Spiritûs Chloroformi, fl. drm. 1; Aquæ Menthæ Piperitæ, ad fl. drs. 12. Make a draught. To be taken occasionally. *In severe colic.*

℞. Spiritûs Ammoniæ Aromatici, min. 75; Spiritûs Ætheris, fl. drm. 1; Tincturæ Belladonnæ, min. 12; Acidi Hydrocyanici Diluti, min. 8; Syrupi, ad fl. oz. 2. Mix. One teaspoonful in the same quantity of water every four hours. *For a child two years old with hooping cough.*

87. *Valerian Draught.*

℞. Tincturæ Valerianæ Ammoniatæ, min. 40; Infusi Valerianæ, fl. oz. 1. Make a draught. To be taken occasionally. *In hysteria.*

88. *Lobelia, Ether, &c.*

℞. Tincturæ Lobeliæ Ætheræ, fl. drs. 3; Vini Ipecacuanhæ, fl. drs. 2; Misturæ Ammoniaci, ad fl. oz. 6. Mix. Two tablespoonfuls every six hours. *In the dyspnœa of asthma, when there is vesicular emphysema.*

89. *Assafœtida and Chiretta.*

℞. Tincturæ Assafœtidæ, fl. drs. 2; Spiritûs Ammoniæ Aromatici, fl. drs. 3; Tincturæ Chiratæ, fl. drs. 7. Mix. Direct,—"Sixty drops in a wineglassful of water every two or three hours, until the paroxysms cease." *In hysteria.*

90. *Aconite and Creasote.*

℞. Tincturæ Aconiti, min. 45; Misturæ Creasoti, ad fl. oz. 8. Mix. One-sixth part three times a day. *In some cases of obstinate sickness, such as occurs during pregnancy and in hysteria.* See F. 41.

91. *Nitric Acid Mixture.*

℞. Acidi Nitrici Diluti, fl. drs. 12; Tincturæ Cardamomi Compositæ, fl. drs. 3; Syrupi, fl. oz. 3½; Aquæ, fl. oz. 1. Mix. One or two small teaspoonfuls every two hours. SIR G. D. GIBB *states that nitric acid is a specific in the treatment of hooping cough, curing the disease in from two to fifteen days. He recommends this formula.*

92. *Sulphate of Zinc and Belladonna.*

℞. Zinci Sulphatis, gr. 8; Extracti Belladonnæ, gr. 2; Aquæ, fl. oz. 4. Mix. Half an ounce four times a day. DR. FULLER.—*For a child above three years of age with hooping cough. Every other day the strength of the mixture may be augmented in the proportion of one dose. The belladonna, it is said, can be thus gradually increased to doses of five grains without any mischief.* See F. 326.

93. *Valerianate of Quinia.*

℞. Quiniæ Valerianatis, gr. 12–20; Extracti Gentianæ, gr. 40. Divide into twelve pills, silver them, and order one to be taken three times a day. *In hysteria, and analogous nervous disorders.*

94. *Stramonium, Colchicum, and Digitalis.*

℞. Potassæ Citratis, gr. 120; Tincturæ Stramonii, fl. drm. 1; Tincturæ Colchici Seminis, fl. drs. 2; Infusi Digitalis, fl. oz. 2; Aquæ Menthæ Piperitæ, ad fl. oz. 8. Mix. One-sixth part three times a day. *In irregular gout, with dyspnœa or violent palpitation, and a full pulse.*

95. *Sumbul and Ether.*

℞. Sumbuli Radicis, gr. 240; Spiritûs Ætheris, fl. oz. 4. Macerate in a stoppered bottle for seven days, and then filter. Dose, min. 20—30. *In neuralgia, hysterical fits, &c.*

VI. ASTRINGENTS.

96. *Rhatany Mixtures.*

℞. Tincturæ Rhei, fl. drs. 3; Infusi Krameriæ, fl. oz. 8. Make a mixture, and order one-sixth part to be taken every six or eight hours. *A valuable astringent in common diarrhœa.*

℞. Extracti Krameriæ, gr. 20; Aquæ, fl. drs. 12. Make a draught. To be taken three times a day. *In hæmaturia, passive intestinal hæmorrhage, &c.*

℞. Potassæ Chloratis, gr. 60; Tincturæ Krameriæ, fl. drs. 6; Aquæ, ad fl. oz. 8. Mix. One-sixth part three times a day. *In relaxation of the buccal mucous membrane, elongation of the uvula, sponginess of the gums, &c.*

97. *Catechu Mixtures.*

℞. Tincturæ Catechu, fl. drs. 3—6; Pulveris Cretæ Aromatici, gr. 90; Olei Menthæ Piperitæ, min. 6; Extracti Opii Liquidi, min. 30; Misturæ Cretæ, ad fl. oz. 8. Mix. One-sixth part after every relaxed motion. *Efficacious in checking simple diarrhœa. In some instances half an ounce of castor oil should be given four hours before commencing this mixture.*

℞. Tincturæ Catechu, fl. drm. 1; Acidi Sulphurici Aromatici, min. 15; Olei Menthæ Piperitæ, min. 1; Infusi Catechu, fl. oz. 1. Mix. To be taken two or three times a day.

℞. Tincturæ Catechu, fl. drs. 3; Spiritûs Chloroformi, fl. drs. 6; Extracti Belæ Liquidi, fl. drs. 12; Infusi Maticæ, ad fl. oz. 6. Mix. Two tablespoonfuls to be taken three or four times a day. *In chronic diarrhœa and dysentery.*

℞. Extracti Belæ Liquidi, gr. drs, 1—2; Syrupi Gummi Rubri, fl. dr. 1; Aquæ fl. oz. 1. Mix. To be taken three or four times a day. *In chronic dysentery.*

℞. Pulveris Catechu Compositi, gr. 30; Pulveris Cretæ Aromatici cum Opio, gr. 20. Make a powder. To be taken night and morning.

98. *Vegetable Charcoal.*

℞. Carbonis Ligni, Theriacæ, āā oz. 1. Mix. Direct one teaspoonful to be taken three or four times a day. *In some cases of chronic diarrhœa, when the irritation is kept up by fæcal fermentation. In fetid eructations. The charcoal should be recently prepared.* Charcoal biscuits are also useful.

99. *Tannin and Nitric Acid.*

℞. Acidi Tannici, gr. 30; Acidi Nitrici Diluti, fl. drm. 1; Tincturæ Lupuli, fl. drs. 4; Infusi Gentianæ, ad fl. oz. 8. Mix. Direct,—"One-sixth part three times a day."—*To restrain secretion in chronic bronchial catarrh, in phthisis when the cavities are large and the walls throw out considerable quantities of purulent matter, in nervous debility, and in most cases where an astringent is required. When a ferruginous tonic is indicated, the above mixture may be given night and morning, and some preparation of steel in the middle of the day.*

100. *Aromatic Sulphuric Acid and Opium.*

℞. Acidi Sulphurici Aromatici, fl. drs. 2; Tincturæ Camphoræ Compositæ, fl. oz. 1; Aquæ Cinnamomi, ad fl. oz. 8. Mix. Label,—"One-sixth part three times a day, about an hour before each meal."

101. *Perchloride of Iron.*

℞. Tincturæ Ferri Perchloridi, min. 15; Acidi Hydrochlorici Diluti, min. 10; Aquæ Aurantii Floris, fl. drs. 12. Make a draught. To be taken every six hours. *In some cases of epistaxis, hæmorrhage from the stomach, &c.*

102. *Oil of Turpentine.*

℞. Olei Terebinthinæ, min. 10—20; Misturæ Amygdalæ, fl. oz. 1. Make a draught. To be taken every hour. *In severe hæmoptysis, especially where the individual is weak and cachectic.*

℞. Olei Terebinthinæ, min. 10; Tinct. Opii, min. 10; Mucilaginis Acaciæ, fl. drs. 4; Aquæ, ad fl. oz. 1. Make a draught. To be taken every two or three hours. *In hæmorrhage from the bowel in enteric fever.*

℞. Mucilaginis Acaciæ, fl. drs. 4; Sodæ Bicarbonatis, gr. 10; Olei Terebinthinæ, min. 10; Olei Anethi, min. 1; Aquæ Destillatæ, ad fl. drs. 12. Make a draught. To be taken thrice daily. *In passive hæmatemesis.* See F. 50.

103. *Gallic Acid.*

℞. Acidi Gallici, gr. 10—15; Aquæ Destillatæ, fl. drs. 12. Make a draught. To be taken every four hours.

℞. Acidi Gallici, gr. 4; Extracti Cannabis Indicæ, gr. ½; Confectionis Rosæ Gallicæ, gr. 1. Make a pill. To be taken every night at bedtime. *To check the night-sweats in phthisis.*

℞. Acidi Gallici, gr. 8; Morphiæ Hydrochloratis, gr. ¼; Confectionis Rosæ Gallicæ, sufficient to make two pills. Label,—"To be taken every night at bedtime." *To relieve the cough and night-sweats of phthisis.*

℞. Glycerini Acidi Gallici, fl. drs. 6—10; Acidi Sulphurici Diluti, fl. drs. 2; Extracti Ergotæ Liquidi, fl. drs. 3; Aquæ Cinnamomi, ad fl. oz. 8. Mix and label,—"One-eighth part every four or six hours." *In uterine hæmorrhage, whether due to cancer, polypus, simple ulceration, or a flabby condition of the walls.*

℞. Acidi Gallici, gr. 15—25; Acidi Sulphurici Aromatici, min. 15—20; Tincturæ Cinnamomi, fl. drs. 2; Aquæ Destillatæ, ad fl. oz. 2. Make a draught. To be taken every four hours until the bleeding ceases. *In profuse menorrhagia, hæmoptysis, hæmatemesis, &c.*

℞. Acidi Gallici, gr. 12; Pulveris Ipecacuanhæ Compositi, gr. 5. Make a powder. To be taken every eight or twelve hours. *A valuable astringent in hæmorrhage from the lungs, stomach, intestines, or kidneys.*

104. *Cinnamon Mixtures.*

℞. Tincturæ Cinnamomi, fl. drs. 6; Acidi Nitrici Diluti, fl. drs. 2. Mix, and label,—"Thirty drops in a wineglassful of water every two hours."—*Useful in passive hæmorrhages from the kidneys, bladder, uterus, &c.*

℞. Tincturæ Cinnamomi, fl. drs. 2; Spiritûs Ammoniæ Aromatici, fl. drs. 2; Decocti Hæmatoxyli, ad fl. oz. 6. Mix. One-fourth part after every relaxed motion.

℞. Tincturæ Cinnamomi, fl. drs. 2; Aquæ Cinnamomi, fl. oz. 1. Make a draught. To be taken thrice daily. *In menorrhagia especially, but also in other varieties of passive hæmorrhage.* See a paper by the Author, *Lancet*, 15 October, 1853.

105. *Matico and Rhatany.*

℞. Tincturæ Krameriæ, fl. drs. 12; Syrupi Papaveris, fl. drs. 6; Infusi Maticæ, ad fl. oz. 8. Mix. One tablespoonful every three or four hours. *In the diarrhœa of tubercular phthisis.*

106. *Sulphate of Copper and Opium.*

℞. Cupri Sulphatis, Extracti Opii, āā gr. ¼; Extracti Gentianæ, q.s. Make a pill. To be taken three or four times a day. *In obstinate diarrhœa.*

107. *Nitrate of Silver and Opium.*

℞. Argenti Nitratis, gr. ½; Extracti Opii, gr. 2. Make a pill. To be taken night and morning. *In very obstinate diarrhœa where opium agrees with the system.* See F. 59.

108. *Kino and Logwood.*

℞. Tincturæ Kino, fl. drs. 6; Vini Ipecacuanhæ, fl. drs. 2; Decocti Hæmatoxyli, ad fl. oz. 8. Mix. One sixth part three times a day. *In chronic dysentery, diarrhœa, abundant secretion of mucus from lining membrane of colon and rectum, &c.*

109. *Cascarilla and Squills.*

℞. Tincturæ Scillæ, fl. drs. 1½—2; Acidi Sulphurici Aromatici, fl. drm. 1. Liquoris Morphiæ Hydrochloratis, min. 30; Infusi Cascarillæ, ad fl. oz. 8. Mix. One-sixth part three times a day. *In chronic bronchitis with profuse expectoration.*

110. *Alum and Syrup of Red Poppy.*

℞. Aluminis, gr. 30; Syrupi Rhœados, fl. drs. 3; Aquæ, ad fl. oz. 2. Mix. One teaspoonful every two or three hours. *In the catarrh of infants, where the secretion from the bronchial tubes is excessive.*

111. *Oxide of Zinc.*

℞. Zinci Oxidi, gr. 12; Extracti Conii, *vel* Hyoscyami, gr. 18. Make a mass, divide into six pills, and order one to be taken every night at bedtime. *For the relief of night sweats in phthisis and other exhausting diseases, there are few remedies more serviceable than the foregoing.*

℞. Zinci Oxidi, gr. 2; Morphiæ Hydrochloratis, gr. ⅙; Extracti Anthemidis, gr. 3. Make a pill, to be taken night and morning.

112. *Preparations of Bismuth.*

℞. Bismuthi Carbonatis, gr. 60; Syrupi Papaveris, fl. drs. 4; Mucilaginis Tragacanthæ, fl. oz. 4; Aquæ, ad fl. oz. 8. Mix. One-sixth part every six or eight hours. *Useful in checking the diarrhœa of phthisis, typhoid fever, &c.*

℞. Bismuthi Carbonatis, gr. 80; Pulveris Kino Compositi, gr. 30; Tincturæ Cinnamomi, fl. drs. 3; Mucilaginis Tragacanthæ, fl. oz. 4; Aquæ, ad fl. oz. 6. Mix. One-sixth part every four hours.

℞. Bismuthi Subnitratis, gr. 100. Divide into six powders, and order one to be taken every night at bedtime in a teacupful of milk arrowroot with one tablespoonful of brandy. *In all cases where the use of bismuth is indicated with a stimulant.* See F. 65.

113. *Astringent Enemata.*

℞. Olei Terebinthinæ, min. 30; Tincturæ Kino, fl. drs. 2; Extracti Opii Liquidi, min. 10—25; Mucilaginis Amyli, fl. oz. 2. Make an enema. *To check the purging in typhoid fever. It may be employed twice or thrice in the twenty-four hours, if necessary.*

℞. Bismuthi Subnitratis, gr. 20; Tincturæ Catechu, fl. drm. 1; Liquoris Morphiæ Hydrochloratis, min. 30; Mucilaginis Amyli, fl. oz. 2. Mix for an enema. *To check the purging of phthisis, fever, &c. It may be administered every twelve hours.*

114. *Chloroform, Opium, and Castor Oil.*

℞. Chloroformi, min. 6—12; Tincturæ Camphoræ Compositæ, fl. drs. 2; Olei Ricini, fl. drs. 3; Mucilaginis Tragacanthæ, fl. drs. 3. Make a draught, to be taken immediately. *In choleraic diarrhœa.*

115. *Alum and Sulphuric Acid.*

℞. Aluminis, gr. 100; Syrupi Rhœados, fl. drs. 6; Infusi Rosæ Acidi, ad fl. oz. 8. Mix. Two tablespoonfuls every six hours. *In passive hæmorrhage. Also in some cases of lead colic.*

116. *Ammonia Iron-Alum, &c.*

℞. Ferri Ammonio-Sulphatis, gr. 30—60; Aquæ Destillatæ, fl. oz. 8. Mix. One-sixth part every six or eight hours. *An excellent astringent in some forms of hæmatemesis, hæmoptysis, &c.*

℞. Aluminis, gr. 90; Ferri Sulphatis, gr. 20; Quiniæ Sulphatis, gr. 4; Acidi Sulphurici Diluti, fl. drm. 1; Syrupi Limonis, fl. oz. 1; Aquæ Destillatæ, ad fl. oz. 8. Mix and label,—"One-eighth part to be taken three times a day, after food, in a wineglassful of water."

117. *Lead and Acetic Acid.*

℞. Plumbi Acetatis, gr. 5—10; Extracti Opii, gr. $\frac{1}{4}$—$\frac{1}{2}$; Confectionis Rosæ Gallicæ, sufficient to make two pills. To be taken every two or three hours, with the following draught:—℞. Acidi Acetici Diluti, fl. drs. 2; Aquæ Cinnamomi, fl. drs. 6. Mix. *In severe hæmoptysis.—The acetate of lead is inferior to gallic acid as an astringent, unless given in larger doses than are commonly employed. According to the Author's experience, this lead salt may be prescribed in* 5, 10, *or even* 20 *gr. doses, with great advantage, in cases of uterine hæmorrhage requiring prompt suppression. As doses of ten grains, repeated every four hours for forty-eight or sixty hours, have given rise to attacks of colic, the Author has not ventured on the large quantities* (60 *to* 180 *grs.) recommended by* Dr. C. K. Irwin.

118. *Cold as a Local Astringent.*

The best and cheapest freezing mixture is made with ice and common salt in equal parts. Any of the following, however, will prove useful:—

MIXTURES.	PARTS.	THERM. SINKS.
Chloride of Ammonium	5	From 50° to 10° Fahr.
Nitre	5	
Water	10	
Nitrate of Ammonia	1	From 50° to 4° Fahr.
Water	1	
Snow	2	From 32° to – 4° Fahr.
Common Salt	1	
Snow or Ice	12	From 18° to – 25° Fahr.
Common Salt	5	
Nitrate of Ammonia	5	

VII. BATHS.

119. *Temperature of Simple Baths.*

BATH.	WATER.	VAPOUR.	AIR.
The Cold	33° to 65° Fahr.		
,, Cool	65° to 75°		
,, Temperate	75° to 85°		
,, Tepid	85° to 92°	90° to 100°	96° to 106°
,, Warm	92° to 98°	100° to 115°	106° to 120°
,, Hot	98° to 112°	115° to 140°	120° to 180°

120. *Nitro-Hydrochloric Acid Baths.*

℞. Acidi Nitrici, fl. drs. 12; Acidi Hydrochlorici, fl. oz. 1—3; Aquæ Calidæ, C. 30. Mix. To be prepared in a wooden bath. The patient should remain in it from ten to twenty minutes. *Useful in cases where the liver is inactive,—as in invalids from tropical climates.*

℞. Acidi Nitrici, fl. drs. 4; Acidi Hydrochlorici, fl. oz. 1; Aquæ Calidæ, C. 4. Mix. For a footbath. *In dyspepsia, with derangement of the liver and constipation. To be used in a wooden or earthenware vessel.*

121. *Alkaline Bath.*

℞. Sodæ Carbonatis, lb. 1; Aquæ Ferventis, C. 30. Mix. *In the lithic acid diathesis, chronic squamous diseases of the skin, chronic rheumatism, &c.*

122. *Conium and Starch Bath.*

℞. Extracti Conii, oz. 1; Pulveris Amyli, lb. 1; Aquæ Ferventis, C. 30. Mix, for a bath. *In certain skin diseases, attended with abundant scurf itching.* A simple starch bath without any conium is very soothing to the skin when covered with an irritating rash.

123. *Creasote Bath.*

℞. Creasoti, fl. drs. 3; Glycerini, fl. oz. 4; Aquæ Ferventis, C. 30. Mix. *In squamous disease of the skin.*

124. *Iodine Bath.*

℞. Iodinii, gr. 60; Potassii Iodidi, oz. ½; Liquorice Potassæ, fl. oz. 2; Aquæ Calidæ, C. 30. Mix. *In scrofula, chronic rheumatism, secondary syphilis, and certain skin diseases.*

125. *Sulphur Baths.*

℞. Potassæ Sulphuratæ, oz. 4; Aquæ Calidæ, C. 30. Mix. *Useful in scabies, lead colic, paralysis from lead, &c.*

℞. Potassæ Sulphuratæ, oz. 4; Sodæ Hyposulphitæ, oz. 1; Acidi Sulphurici, fl. drm. 1; Aquæ Calidæ, C. 30. Mix.

126. *Iron, or Oak Bark, Baths.*

℞. Ferri Sulphatis, oz. ½; Aquæ, C. 4. Mix. *Especially useful for strumous and rickety children.*

℞. Quercûs Contusæ, lb. 1; Aquæ Calidæ, O. 2. Mix. Boil for half an hour, and add the strained decoction to three gallons of warm or tepid water. To be used every morning. *For delicate children, &c.*

127. *Salt water Baths.*

℞. Salis Marini (vulgo, "Bay Salt"), lb. ½; Aquæ Tepidæ, C. 4. Mix. Make a sponge bath to be used every morning. *In general debility, chronic rheumatism, &c. The surface of the body should be thoroughly rubbed with a flesh brush and coarse towels.*

℞. Salis Marini, lb. 2; Magnesiæ Sulphatis, oz. 3; Potassii Iodidi, gr. 120; Liquoris Calcis Chloratæ, fl. oz. 1½; Aquæ, C. 30. Mix.

128. *Arsenical Baths.*

℞. Sodæ Carbonatis, oz. 4; Sodæ Arseniatis, gr. 20—36; Aquæ Calidæ, C. 30. Mix. *In rheumatoid arthritis, skin diseases, &c.*

℞. Sodii Chloridi, oz. 1; Sodæ Sulphatis, oz. 1; Sodæ Carbonatis, oz. 2; Sodæ Arseniatis, gr. 52; Aquæ Calidæ, C. 30. Mix.

℞. Potassæ Sulphuratæ, oz. 4; Sodæ Arseniatis, gr. 30—40; Aquæ Calidæ, C. 30. Mix.

129. *Borax Bath.*

℞. Boracis, oz. 4; Glycerini, fl. oz. 3; Aquæ Calidæ, C. 30. Mix. *In some squamous and other irritable diseases of the skin.*

130. *The Turkish Bath.*

The general effect of a hot air bath is to increase the force and rapidity of the circulation, and to induce free perspiration; but if too hot or too prolonged the determination of blood to the skin and lungs becomes so great, that the brain suffers. There is then consequently a lowering of the circulation, with depressed nervous power. A temperature varying from 110° to 165° will usually suffice; while if the perspiration is efficient and continuous, and the sensation agreeable, the patient may remain in the calidarium for from forty to sixty minutes. The bath is always to be taken before a meal—when the stomach is empty.—A Turkish bath is *useful* in removing local congestions, in clearing the pores and in inducing a healthy condition of the skin and mucous membranes, in eliminating noxious matters from the blood, and in imparting a sense of elasticity and vigour to the system. Hence it may be recommended in dropsy due to renal or hepatic disease, in gout and rheumatism, in many cutaneous affections, in albuminuria, in certain forms of neuralgia, in some cases of obesity, and so on. It is *injurious* when there is any obstruction to the circulation, or when the heart or vessels are affected with fatty degeneration, or when there are any symptoms of disease of the nervous centres, or when there is a tendency to vertigo or syncope, as well as in advanced life. Women who are pregnant, or who are menstruating, ought not to have recourse to it.

131. *Mercurial Vapour Bath.*

The patient is seated on a chair, and covered with an oil-cloth lined with flannel which is supported by a proper framework. Under the chair are placed a copper bath containing water, and a metallic plate on which is put from sixty to one hundred and eighty grains of the bisulphuret of mercury, or the same quantity of the grey oxide, or of the red oxide of this metal. In syphilitic affections of the skin, testes, and bones, from five to thirty grains of the green iodide of mercury may be employed; or a mixture of twenty grains of the green iodide with ninety grains of the bisulphuret often proves efficacious. Under the bath and plate, spirit-lamps are lighted. The patient is thus exposed to the influence of three agents—heated air, steam, and the vapour of mercury. At the end of five to ten minutes perspiration commences, which becomes excessive in ten or fifteen minutes longer. The lamps are now to be extinguished; and when the patient has become moderately cool, he is to be rubbed dry. He should then drink a cup of warm decoction of guaiacum or sarsaparilla, and repose for a short time.—LANGSTON PARKER. *In constitutional syphilis when mercury is indicated. This method of introducing mercury into the system may also be adopted with benefit in other diseases, in place of administering the metal by the mouth.*

MR. HENRY LEE'S mode of proceeding is more simple, and is the one which the Author has frequently adopted with great success. A convenient apparatus is used, made by most instrument makers, consisting of a kind of tin case containing a spirit-lamp. In the centre, over the flame, is a small tin plate, upon which from fifteen to thirty grains of calomel are placed; while around this is a sort of saucer filled with boiling water. The lamp having been lighted, the apparatus is placed under a common cane-bottom chair, upon which the patient sits. He is then enveloped, chair and all, in one or more large blankets; and so he remains well covered up, for about twenty minutes, when the water and mercury will be found to have disappeared. About five minutes afterwards he may put on his shirt and go to bed; but it is better not to use a towel, since it can only be disadvantageous to wipe off the calomel deposited on the skin.

132. *Gelatine Bath.*

Take of Gelatine, or Common Glue, lb. 1; dissolve in a little boiling water, and then add twenty gallons of hot water to form a bath. This bath can oft-times be made more efficacious by soaking in it one or two pounds of bran confined in a muslin bag. *In eczema, and other irritable cutaneous affections.*

133. *Mustard Footbath.*

℞. Pulveris Sinapis, oz. 2—4; Aquæ Calidæ, C. 4. Mix, for a footbath. *In congestions of the head and chest, headache, languid circulation, as well as in some cases of amenorrhœa, &c.*

134. *Cold Affusion.*

The patient is seated in an empty bath, and from four to six buckets of cold water (about 40° Fahr.) are poured over his head and chest from a height of two or more feet. He is then quickly dried, and replaced in bed. The colder the water and the greater the height from which it is poured, the more stimulating the effect. Affusion, as thus practised by Dr. Currie, proved very valuable in the treatment of typhus. It may be resorted to when the temperature of the body is permanently above its normal (about 98 4° Fahr.) standard, when there is no feeling of chilliness, when the body is not wholly bathed in sweat, when there is not much irritability of the nervous system, and when there is great stupor. The effect is to lower the temperature, to lessen the frequency of the pulse and respiration, to render the tongue moist and soft, to diminish or remove the stupor, to procure sleep, and sometimes to produce a critical perspiration. Cold affusion can seldom be resorted to with safety more than once in every twenty-four hours.

When it is desirable to apply a *douche-bath* to one or more of the joints it is only necessary to affix two or three yards of large sized india rubber tubing to the tap of a cistern. The patient must sit in an empty bath, into which the water may fall as it plays upon the limb. The reaction is greater after the use of hot and cold douches alternately, than after the employment of water of only one temperature.

135. *The Shallow Bath.*

The patient sits in a bath some six feet long, with a depth of water (temperature 60° to 80° Fahr.) varying from 8 to 12 inches. The extremities and trunk are well rubbed by an assistant, while water is gently poured over the head. The duration of the bath ought to vary from five minutes to three-quarters of an hour, until the temperature of the body is lowered. The colder the water and the shorter the stay in it, the more stimulating and less sedative will be the effect. This bath is less exciting than the cold affusion, and is chiefly indicated where the latter would be improper,—*i.e.*, where there is much nervous irritability. It is also better for women, who can seldom bear the cold affusion.

As a substitute for the shallow bath the *dripping-sheet* is sometimes used. The patient stands upright in an empty bath, while the attendant, placed at his back, suddenly envelopes him in a sheet dipped in cold water. The surface of the body is rapidly rubbed by the servant's flat hands for some three minutes, until the bather is in a glow; when a dry sheet is quickly substituted for the wet one, and the rubbing continued. The whole process should be over in five or six minutes.

136. *Wet-sheet Packing, &c.*

The patient is closely enveloped in a sheet which has been dipped in cold or tepid water and well wrung out. Or a long towel is wrung out of tepid water and applied along the whole length of the back, while another, similarly prepared, is laid over the chest and abdomen. In either case the patient is then carefully wrapped in a blanket, covered with three or more blankets, and has a down coverlet tucked over all. He should remain thus for 30, 45, or 60 minutes, lying on his side, or in a semi-recumbent position; the duration being timed by the sedative effect produced. The sweating is not generally excessive. But the water, urea, and chloride of sodium of the urine are slightly increased; this increase being considerable when the sheet is continued for four hours. At the conclusion the shallow bath may be used for two or three minutes, as a tonic.

A *blanket-bath* affords an easy means of inducing sweating. A blanket is wrung out of hot water, and wrapped round the patient. He is to be packed in three or four dry blankets, and allowed to repose for thirty minutes. The surface of the body should then be well rubbed with warm towels, and the patient made comfortable in bed.

The *wet compress* consists merely of a roll of flannel or calico, dipped in cold water and wrung out, and then applied around the seat of pain. Over this a piece of waterproof cloth is worn. The compress is kept on night and day.

137. *The Warm Bath as a Cooling Agent.*

The warm bath at a temperature of 95° Fahr. must prove a cooling agent to the body of a fever patient at 100° or 105°. The immersion should continue from fifteen minutes to an hour or longer. Its sedative effects render it valuable where the nervous system is irritable.

The temperature may, however, be lowered to 70° or 65° by the addition of cold water while the patient is in the bath. This has proved effectual in saving life in cases of hyperpyrexia during acute rheumatism, enteric fever, &c. The temperature of the patient must be observed continuously, and when it has fallen to 102°, or thereabouts, or when shivering comes on, he must be removed to bed. Enteric fever, moreover, has been extensively treated by baths of low temperature with considerable success.

In cases of delirium tremens with high fever, *cold superfusion* may be used while the patient is held in the warm bath. From ten to thirty buckets of cold water are to be poured slowly over the head; hot water being continually added to the bath to maintain its heat at 95°. This treatment may frequently be counted upon to produce sound sleep.

138. *Acid Sponging.*

One part of vinegar is to be added to two or three parts of cold water, and the body well sponged with the mixture. Simple tepid water may sometimes be advantageously used. The patient being weak and unable to move, the sponging must be done by degrees:—*i.e.* the arms, chest, back, and legs are to be rapidly washed and dried. *In many cases of fever, inflammation, scarlatina, &c.*

VIII. CATHARTICS AND ANTHELMINTICS.

139. *The Common Black Draught.*

℞. Magnesiæ Sulphatis, gr. 120; Mannæ, gr. 160; Tincturæ Sennæ, fl. drs. 2; Infusi Sennæ, ad fl. drs. 12. Make a draught. To be taken early in the morning. One ounce and a half of the officinal COMPOUND MIXTURE OF SENNA is equivalent to the foregoing.

140. *Calomel, Jalap, and Epsom Salts.*

℞. Hydrargyri Subchloridi, gr. 5; Pulveris Jalapæ, gr. 15. Make a powder. To be taken immediately; with the following draught three hours afterwards:—

℞. Magnesiæ Sulphatis, gr. 120; Mannæ, gr. 60; Tincturæ Jalapæ, fl. drs. 2; Aquæ Carui, ad fl. drs. 12. Mix. *A good active purgative in head affections, &c. as well as at the commencement of many acute diseases.*

141. *The White Mixture of Hospitals.*

℞. Magnesiæ Sulphatis, oz. 1½; Magnesiæ Carbonatis, gr. 120; Aquæ Menthæ Piperitæ, fl. oz. 8. Mix. The addition of two fluid drachms of Colchicum wine is sometimes advantageous. One-sixth part early every morning.

142. *Epsom Salts and Sulphuric Acid.*

℞. Magnesiæ Sulphatis, oz. 2; Acidi Sulphurici Aromatici, min. 90; Tincturæ Hyoscyami, fl. drs. 6; Infusi Quassiæ, ad fl. oz. 8. Mix. One-sixth part two or three times a day. *In painter's colic, copper colic, &c.*

℞. Magnesiæ Sulphatis, oz. ½; Infusi Rosæ Acidi, fl. oz. 2. Make a draught. To be taken early in the morning. *In mild febrile affections with much constipation.*

143. *Glauber's Salts and Sulphuric Acid.*

℞. Sodæ Sulphatis, gr. 120; Ferri Sulphatis, gr. 3; Acidi Sulphurici Diluti, min. 15; Tincturæ Hyoscyami, min. 40; Infusi Calumbæ, fl. oz. 2. Make a draught. To be taken the first thing in the morning. *In obstinate constipation with debility. Also in some varieties of hæmorrhage where an aperient is needed,—as purpura, hæmatemesis, &c.*

℞. Sodæ Sulphatis, gr. 240; Acidi Sulphurici Diluti, fl. drm. 1; Infusi Gentianæ Compositi, fl. oz. 6. Mix. Three tablespoonfuls to be taken daily, after luncheon or dinner. *In habitual constipation with flatulence.*

144. *Glauber's Salts and Taraxacum.*

℞. Sodæ Sulphatis, gr. 120; Succi Taraxaci, fl. drm. 1; Decocti Taraxaci, fl. oz. 2. Make a draught. To be taken every morning before breakfast. *In constipation with deficient secretion of bile.* The taraxacum is a good vehicle for the sulphate of soda, even if it is incapable of influencing the secretion of bile. See F. 148.

145. *Aloes, Senna, and Jalap.*

℞. Tincturæ Sennæ, Tincturæ Jalapæ, āā fl. drs. 2; Infusi Sennæ, fl. oz. 2; Decocti Aloes Compositi, ad fl. oz. 8. Mix. Two tablespoonfuls to be taken night and morning.

146. *Rhubarb, Gentian, and Senna.*

℞. Tincturæ Rhei, fl. drs. 2; Spiritûs Ammoniæ Aromatici, min. 40; Infusi Gentianæ Compositi, Infusi Sennæ, āā fl. drs. 7. Make a draught. To be taken every morning an hour before breakfast. *A mild aperient in gouty dyspepsia.*

147. *Nitric Acid, Senna, and Taraxacum.*

℞. Acidi Nitrici Diluti, min. 90; Spiritûs Ætheris Nitrosi, fl. drs. 2; Succi Taraxaci, fl. drs. 12; Tincturæ Sennæ, fl. oz. 4; Infusi Gentianæ Compositi, ad fl. oz. 8. Mix. One-sixth part twice or thrice daily. *In dyspepsia with debility and constipation. Also in passive hepatic congestion, in amenorrhœa with a loaded liver, &c.*

148. *Alkaline Aperients.*

℞. Decocti Aloes Compositi, Infusi Gentianæ Compositi, āā fl. oz. 4; Tincturæ Nucis Vomicæ, fl. drm. 1; Liquoris Potassæ, fl. drs. 2. Mix. One-sixth part, with two or three tablespoonfuls of water, early every morning. *Useful in bilious headache.*

℞. Sodæ Sulphatis, oz. 1½; Sodæ Phosphatis, oz. 1; Syrupi Zingiberis, fl. drs. 6; Aquæ ad fl. oz. 8. Mix. Three large tablespoonfuls immediately; the dose to be repeated after two hours, unless the bowels should be freely acted on.

℞. Sodæ Sulphatis, Sulphuris Præcipitati, āā oz. 1½. Mix. Label,—"One teaspoonful in a tumblerful of milk and water early in the morning."—*In rheumatoid arthritis, chronic rheumatism, sciatica, pruritus, &c.*

149. *Phosphate of Soda and Aloes.*

℞. Extracti Rhei, gr. 10; Sodæ Phosphatis, gr. 60; Decocti Aloes Compositi, fl. drs. 6; Aquæ Menthæ Viridis, ad fl. oz. 2. Make a draught. To be taken occasionally at bedtime. *In some forms of chronic gout, jaundice from gallstones, &c.*

150. *Aloes, Senna, and Epsom Salts.*

℞. Vini Aloes, fl. drs. 2; Infusi Sennæ, fl. drs. 14; Magnesiæ Sulphatis, gr. 240. Mix. Half of this mixture to be taken about 7 o'clock in the morning, and the remainder two hours after breakfast, if required.

151. *Jalap and Senna.*

℞. Tincturæ Sennæ, fl. oz. 1; Tincturæ Jalapæ, fl. drs. 2; Vini Colchici, fl. drm. 1; Aquæ Pimentæ, fl. oz. 2. Mix. Label,—"Half of this draught immediately, and the remainder in six hours, if necessary."

℞. Pulveris Jalapæ Compositi, gr. 30—60; Syrupi Sennæ, fl. drm. 1; Aquæ Camphoræ, fl. drs. 15. Make a draught. To be taken early every morning. *In dropsy.*

℞. Jalapæ Resinæ, gr. 3; Extracti Hyoscyami, gr. 2. Mix into a pill, to be taken at bedtime. An ounce and a half of the Compound Mixture of Senna should be administered on the following morning. *In dropsy and in hepatic disease where an active purgative is needed.*

152. *Saline Purgative.*

℞. Vini Antimoniale, fl. drm. 1; Magnesiæ Sulphatis, gr. 160; Liquoris Ammoniæ Acetatis, fl. drs. 12; Syrupi Papaveris, fl. drs. 6; Aquæ Camphoræ, ad fl. oz. 8. Mix. One-sixth part two or three times in the twenty-four hours. *Simple fever with constipation. In hepatic congestion, &c.*

153. *Sulphur and Magnesia.*

℞. Magnesiæ Carbonatis, gr. 20; Sulphuris Præcipitati, gr. 25; Sodæ Bicarbonatis, gr. 10; Pulveris Zingiberis, gr. 3. Make a powder. To be taken early in the morning in a tumblerful of milk. *A valuable aperient for delicate females subject to rheumatism. Also in prurigo, and some other skin diseases.*

154. *Steel and Aloes.*

℞. Ferri Sulphatis Granulatæ, gr. 2; Pilulæ Aloes et Myrrhæ, gr. 3. Make a pill, to be taken thrice daily after meals. *In amenorrhœa, chlorosis, hysteria with constipation and debility, &c.* See F. 421.

155. *Pepsine and Aloes.*

℞. Pepsinæ Porci, gr. 32; Extracti Aloes Barbadensis, gr. 4—8; Glycerini, sufficient to make a mass. Divide into eight pills, and order one to be taken every day at dinner. To prevent them from adhering to each other, these pills should either be silvered or coated with lycopodium—the delicate and tasteless powder contained in the spore cases of Lycopodium selago and Lycopodium clavatum. *Valuable in gastric and duodenal dyspepsia, some diseases of the rectum, certain forms of suppressed menstruation, &c.*

℞. Extracti Aloes, gr. 1; Extracti Belladonnæ, gr. $\frac{1}{3}$. Make a pill to be taken daily after dinner or supper.

156. *Aloes and Galbanum.*

℞. Pilulæ Aloes et Myrrhæ, Pilulæ Assafœtidæ Compositæ, āā gr. 5. Make two pills. To be taken night and morning. *In hysteria with attacks of flatulent colic, and in some forms of amenorrhœa with constipation.*

157. *Elaterium, or Wild Cucumber.*

℞. Liquoris Ammoniæ Acetatis, fl. drs. 9; Spiritûs Ætheris Nitrosi, fl. drs. 4; Elaterii, gr. 1; Syrupi Zingiberis, fl. drs. 3. Mix. Direct.—"Two small teaspoonfuls in a wineglassful of water every two hours, until the bowels are freely acted on." *In the early stages of acute dropsy with albuminuria.*

℞. Elaterii, gr. $1\frac{1}{2}$; Pulveris Capsici, gr. 9; Hydrargyri Subchloridi, gr. 12; Extracti Hyoscyami, gr. 18. Make a mass, divide into twelve pills, and order two to be taken for a dose. *If a very active purgative is required, the quantity of elaterium may be doubled. The capsicum prevents the nausea which this drug often produces.*

℞. Elaterii, gr. 1; Digitalis Foliæ, gr. 2—4; Extracti Gentianæ, gr. 12. Divide into four pills, and order one to be taken every night. *In dropsical effusions, and where it is desirable to produce copious watery stools.*

158. *Gamboge and Galbanum.*

℞. Pilulæ Cambogiæ Compositæ, Pilulæ Assafœtidæ Compositæ, āā gr. 5. Make two pills. To be taken every night at bedtime. *A good drastic hydragogue cathartic, acting chiefly upon the small intestines.*

159. *Calomel and Jalap, &c.*

℞. Hydrargyri Subchloridi, gr. 2—3; Pulveris Scammonii Compositi, gr. 4; Pulveris Aromatici, gr. 5. Mix, for a powder to be taken at bedtime. *A valuable purgative in the cerebral affections of children: also in cases of threadworm.*

℞. Hydrargyri Subchloridi, gr. 2; Extracti Jalapæ, gr. 8. Make into two pills, and order them to be taken at bedtime. *In cerebral affections, &c.*

℞. Hydrargyri Subchloridi, gr. 5; Pulveris Jalapæ Compositi, gr. 20—40. Make a powder, to be taken every night at bedtime. *A good hydragogue cathartic. The calomel increases the effect of the jalap and acid tartrate of potash (cream of tartar).*

℞. Hydrargyri Subchloridi, gr. 2; Pulveris Rhei, gr. 20; Jalapæ Resinæ, gr. 2; Pulveris Zingiberis, gr. 4. Mix. To be taken as a bolus, in a little wafer paper, at bedtime.

160. *Podophyllum Peltatum, or May-apple.*

℞. Podophylli Resinæ, gr. ½; Pulveris Rhei, gr. 5; Extracti Hyoscyami, gr. 3. Make two pills. To be taken every night at bedtime. *As a purgative in jaundice from suppression, in torpid liver, and in dropsy from cardiac or renal or hepatic disease. Podophyllin produces copious bilious stools; but it is rather uncertain, and is apt to gripe unless combined with henbane.*

℞. Podophylli Resinæ, gr. 6; Pulveris Zingiberis, gr. 20; Jalapæ Resinæ, gr. 10; Digitalis Foliæ, gr. 3; Extracti Hyoscyami, gr. 14. Make a mass, divide into twelve pills, and order two to be taken every other night at bedtime. *As a drastic purgative in dropsy.* See F. 30.

161. *Ammonia and Rhubarb.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. 4; Tincturæ Rhei, fl. oz. 2; Infusi Rhei, ad fl. oz. 8. Mix. One-sixth part to be taken night and morning.

162. *Gentian, Ether, and Rhubarb.*

℞. Tincturæ Rhei, fl. oz. 1; Tincturæ Gentianæ Compositæ, fl. oz. 2; Spiritûs Ammoniæ Aromatici, Spiritûs Ætheris, āā fl. drs. 4; Aquæ Pimentæ, fl. oz. 4. Mix. Two tablespoonfuls to be taken occasionally. *In cases of colic, flatulence, nausea or languor, where a warm stomachic aperient is needed.*

163. *Hellebore and Colchicum.*

℞. Tincturæ Hellebori (Phar. Lond. 1851), min. 30; Vini Colchici, min. 25; Tincturæ Rhei, fl. drs. 2; Aquæ Camphoræ, ad fl. oz. 2. Make a draught. To be taken occasionally early in the morning. *Useful in gout, chronic rheumatism, &c.*

164. *Castor Oil.*

℞. Olei Ricini, fl. drs. 2—4. To be taken occasionally about 11 A.M. The taste of castor oil is entirely destroyed by mixing it with a teacupful of well salted and peppered beef tea.

℞. Mucilaginis Tragacanthæ, fl. oz. 2; Aquæ Cinnamomi, fl. oz. 3; Olei Ricini, fl. drs. 12; Tincturæ Rhei, Syrupi Aurantii, āā fl. drs. 6; Tincturæ Opii, min. 30. Mix. One-eighth part every three hours. *In dysentery, when there are scybala in the rectum. Also where an aperient with a sedative is indicated.*

165. *Rhubarb and Magnesia, or Soda.*

℞. Magnesiæ Carbonatis, gr. 120; Pulveris Rhei, gr. 60; Vini Ipecacuanhæ, fl. drs. 2; Pulveris Aromatici, gr. 40; Aquæ Menthæ Piperitæ, fl. oz. 8. Mix. Three tablespoonfuls to be taken every morning.

℞. Pulveris Rhei, Sodæ Bicarbonatis, āā gr. 20; Infusi Rhei, fl. oz. 1. Make a draught. To be taken early in the morning, with two or three tablespoonfuls of water, twice or thrice a week. *For gouty and rheumatic subjects.*

The officinal PULVIS RHEI COMPOSITUS, in doses of 20 to 120 grains, is a valuable mild aperient where the intestinal secretions are deranged or diminished in quantity. *It is commonly known as* GREGORY'S *powder.*

166. *Epsom Salts and Sulphate of Iron.*

℞. Magnesiæ Sulphatis, gr. 120; Ferri Sulphatis, gr. 4; Acidi Sulphurici Diluti, min. 15; Extracti Quassiæ, gr. 20; Aquæ Pimentæ, fl. oz. 2. Make a draught. To be taken early in the morning. *In constipation with general debility.*

167. *Colocynth and Tartarated Antimony.*

℞. Pilulæ Colocynthidis et Hyoscyami, gr. 56; Antimonii Tartarati, gr. 4. Divide into twelve pills, and order one to be taken every night at bedtime. *A valuable purgative in the cerebral congestions of strong subjects.*

168. *Croton Oil.*

℞. Olei Crotonis, min. 1—2; Olei Caryophylli, min. 2; Micæ Panis, sufficient to make a pill. To be taken immediately, and repeated in two hours if necessary.

℞. Olei Crotonis, min. 2; Olei Theobromæ, gr. 30. Make a suppository. To be introduced into the rectum early in the morning—about 5 A.M.

℞. Olei Crotonis, min. 1—2; Pilulæ Colocynthidis Compositæ, gr. 30; Pilulæ Assafœtidæ, Compositæ, gr. 60. Make a mass, divide into eighteen pills, and order three to be taken every night at bedtime. *In cases of sciatica, obstinate neuralgia, &c. with constipation.*

169. *Seidlitz Powder.*

℞. Sodæ Bicarbonatis, gr. 40; Sodæ Tartaratæ, gr. 120. Mix, and make an effervescing draught with thirty-seven grains of Tartaric or Citric Acid dissolved in a tumblerful of water.

The officinal EFFERVESCENT CITRO-TARTRATE OF SODA, in doses of a couple of teaspoonfuls, in a small tumblerful of cold or tepid water, is a very agreeable and mild aperient.

170. *Purified Ox Bile.*

℞. Ammoniæ Carbonatis, gr. 34; Fellis Bovini Purificati, gr. 36. Make a mass, divide into twelve pills, silver them, and order one to be taken three hours after each of the principal meals. *In dyspepsia with nausea, constipation and a deposit of urates in the urine.*

℞. Jalapæ Resinæ, gr. 6—18; Fellis Bovini Purificati, gr. 24; Olei Carui, min. 10; Pilulæ Assafœtidæ Compositæ, gr. 18. Make a mass, divide into twelve pills, and order two to be taken every night two hours after supper. *To prevent an accumulation of fæces, when the large intestines are torpid. Also where there is a deficiency of bile.*

℞. Pilulæ Colocynthidis et Hyoscyami, Fellis Bovini Purificati, Extracti Lupuli, āā gr. 20. Make a mass, divide into twelve pills, silver them, and order one to be taken every day three hours after dinner. *In constipation with flatulence and imperfect digestion of the food.*

℞. Magnesiæ Carbonatis, gr. 30; Tincturæ Jalapæ, fl. drs. 2; Tincturæ Sennæ, fl. oz. 1; Fellis Bovini Purificati, gr. 30; Aquæ Camphoræ, ad fl. oz. 4. Mix, and label,—"Half of this mixture immediately, and the remainder in three hours if necessary."—*A valuable purgative when the rectum is blocked up by hardened fæces.*

CAPSULES containing pig's bile, evaporated to dryness, have been prepared according to the directions of DR. HARLEY. Each capsule contains five grains of prepared bile,—equal to one hundred grains of liquid bile fresh from the gall bladder. Two or three are to be taken for a dose, about two hours after a meal; when stomachal digestion being nearly completed, the chyme is ready to pass into the duodenum. The capsules imbibe moisture in the stomach; and then, in their soft swollen condition, generally get ruptured as they pass through the pylorus. In this way the bile is mingled with the chyme at the same time that the intermixture happens in the healthy organism. *In jaundice from long-continued obstruction. Also in some forms of duodenal dyspepsia arising from sedentary habits.*

171. *Rhubarb, Mercury, and Henbane.*

℞. Pilulæ Hydrargyri (*vel* Hydrargyri cum Cretâ), Pilulæ Rhei Compositæ, Extracti Hyoscyami, āā gr. 20. Mix, divide into twelve pills, and order two to be taken occasionally at bedtime.—*Where a stronger purgative is required the compound colocynth may be substituted for the compound rhubarb pill.*

172. *Sulphate of Manganese.*

℞. Manganesii Sulphatis, gr. 180; Vini Colchici, min. 15; Infusi Sennæ, Infusi Gentianæ Compositi, āā fl. oz. 1. Make a draught, to be taken early in the morning. *In gouty or rheumatic habits, with a deficient secretion of bile.*

173. *Colocynth and Assafœtida.*

℞. Pilulæ Colocynthidis et Hyoscyami, Pilulæ Assafœtidæ Compositæ, āā gr 5. Mix into two pills. To be taken occasionally at bedtime. *In constipation with flatulence. A valuable purgative for hypochondriasis.*

174. *Gamboge, Aloes, and Blue Pill.*

℞. Pilulæ Cambogiæ Compositæ, gr. 5; Pilulæ Hydrargyri, gr. 3. Make two pills. To be taken night and morning. *In dropsy from cardiac or hepatic disease where a drastic purgative is required.*

175. *Extract of Nux Vomica.*

℞. Extracti Nucis Vomicæ, gr. 3; Pulveris Ipecacuanhæ, gr. 6; Pilulæ Rhei Compositæ, *vel* Pilulæ Aloes et Assafœtidæ, gr. 40. Make a mass, divide into twelve pills, and order two to be taken every alternate night at bedtime. *In habitual constipation from atony of the coats of the bowel, with deficient secretion of intestinal mucus.*

℞. Extracti Nucis Vomicæ, gr. 2; Extracti Aloes Barbadensis, gr. 6; Extracti Rhei, gr. 20. Mix and divide into six pills. One to be taken every day at dinner. *In torpor of the colon, some diseases of the rectum, &c.*

℞. Extracti Hyoscyami, gr. 40; Pilulæ Colocynthidis Compositæ, *vel* Jalapæ Resinæ, gr. 20; Extracti Nucis Vomicæ, gr. 3. Mix, and divide into twelve pills. One pill to be taken every night. *In habitual constipation. They may be continued for about ten days.* See F. 378, 387, and 409.

176. *Rhubarb and Magnesia for Infants.*

℞. Pulveris Rhei, gr. 15; Magnesiæ Carbonatis, gr. 60; Aquæ Anethi, fl. drs. 12. Mix, and order one teaspoonful to be taken every two hours until the bowels are freely acted on.

177. *Sulphate of Zinc and Nux Vomica.*

℞. Zinci Sulphatis, gr. 24; Extracti Nucis Vomicæ, gr. 2; Extracti Anthemidis, gr. 30. Mix, divide into twelve pills, and order one to be taken three times a day. *For habitual constipation, after the bowels have been cleared out with a purgative of calomel and colocynth. The pills should be taken immediately after meals, for two or three weeks. They ought to be discontinued gradually.*

178. *Quinine and Rhubarb.*

℞. Quiniæ Sulphatis, gr. 2; Extracti Lupuli, gr. 5; Pilulæ Rhei Compositæ, gr. 3. Mix into two pills, and order them to be taken every day at dinner. *Useful in some forms of dyspepsia, with want of tone.*

179. *Ipecacuanha, Rhubarb, and Oxide of Silver.*

℞. Pulveris Ipecacuanhæ, gr. 1; Pulveris Rhei, gr. 3; Argenti Oxidi, gr. 1; Confectionis Rosæ Caninæ, sufficient to form a pill. *A good dinner pill where there is uneasiness and oppression after meals, the result of slow digestion.*

180. *Steel, Glauber's Salts, &c.*

℞. Ferri Sulphatis Granulatæ, gr. 10; Sodæ Sulphatis, Magnesiæ Sulphatis, āā oz. 1; Sodii Chloridi, gr. 120; Aquæ, O. 1. Mix. Four tablespoonfuls in a tumblerful of warm water early in the morning. *A rough imitation of the Cheltenham Waters. Useful in debility with constipation.*

181. *Steel, Glauber's Salts, and Soda.*

℞. Sodæ Bicarbonatis, gr. 60; Sodii Chloridi, gr. 4; Sodæ Sulphatis, gr. 10; Magnesiæ Sulphatis, gr. 3; Ferri Sulphatis, gr. ¼—1; Aquæ, O. 1. Mix. By adding forty grains of Citric Acid an effervescing water is produced. *A rough imitation of the Vichy Waters. In some forms of chronic gout, &c.*

℞. Sodæ Sulphatis, gr. 120—240; Sodæ Carbonatis, gr. 20; Sodii Chloridi, gr. 15; Cretæ Preparatæ, gr. 10; Ferri Carbonatis Saccharatæ, gr. 15. Make a powder, and direct it to be taken early in the morning in half a pint of water. *An imitation of the Carlsbad Waters.*

182. *Kamela, as an Anthelmintic.*

℞. Pulveris Kamelæ, gr. 60—180, *vel* Tincturæ Kamelæ, fl. drs. 2; Syrupi Aurantii, fl. drs. 2; Mucilaginis Tragacanthæ, fl. drs. 12; Aquæ, ad fl. oz. 3. Make a draught. To be taken early in the morning. A purgative should be administered six hours afterwards. Kamela is an orange-red resinous substance found adhering to the capsules of the Rottlera tinctoria, and is imported from India. *Strongly recommended in tapeworm.*

183. *Turpentine, as an Anthelmintic.*

℞. Olei Ricini, fl. drs. 4; Olei Terebinthinæ, fl. drs. 3; Mucilaginis Tragacanthæ, fl. drs. 4; Syrupi Zingiberis, fl. drm. 1; Aquæ, fl. drs. 4. Make a draught, to be taken early in the morning. *In tapeworm, &c.*

184. *Kousso, as an Anthelmintic.*

℞. Cusso, in pulvere, gr. 240; Mellis Depurati, sufficient to make an electuary. Label,—"Half of this electuary to be taken early in the morning, and the remainder six hours afterwards." *In tapeworm.*

The officinal Infusum Cusso may also be taken in the same way, in doses of fl. oz. 4—8.

185. *Santonin, as an Anthelmintic.*

℞. Santonini, gr. 2—6; Sacchari Lactis, gr. 15. Make a powder. To be taken early in the morning, suspended in a tablespoonful of cream. The patient ought to have fasted for twelve hours previously. The dose may be repeated daily for eight or ten days, if necessary: and its exhibition should be followed at the end of six hours by the administration of an ounce of the Compound Decoction of Aloes. *A specific for the ascaris lumbricoides. Less useful for the tœnia solium and oxyuris vermicularis. The patient should be warned that after a few doses the sight sometimes becomes perverted, so that objects seem to acquire a blue or yellow or some other colour.* One-third of a grain of the resin of podophyllum added occasionally to the dose of santonin appears to increase its efficacy.

186. *Pomegranate, as an Anthelmintic.*

℞. Spiritûs Ætheris, min. 30—60; Decocti Granati Radicis, fl. oz. 1—2. Make a draught. To be taken every three hours until four doses have been used.

℞. Granati Radicis Corticis, gr. 180; Pulveris Sabadillæ, gr. 6; Pulveris Aromatici, gr. 60. Mix, and divide into six powders. One to be taken every two hours until the whole is consumed. *More active than the preceding. A saline purge should be given after the last dose.*

187. *Male Fern, as an Anthelmintic.*

℞. Extracti Filicis Liquidi, min. 20—40; Syrupi Zingiberis, fl. drs. 2; Mucilaginis Tragacanthæ, fl. oz. 2; Aquæ, ad fl. oz. 4. Make a draught. To be taken early in the morning; only liquid nourishment having been allowed the previous day. Four hours afterwards a purgative dose of castor oil or compound decoction of aloes should be administered. *Especially useful for destroying tapeworms.*

188. *Simple Enemata.*

℞. Sodii Chloridi, oz. 1; Decocti Hordei, fl. oz. 12. Mix, to form an Enema. *In simple constipation, to destroy oxyurides, &c.*

℞. Olei Olivæ, fl. oz. 6—8. To be warmed and then injected into the rectum. It should be retained for twelve or eighteen hours. *Very useful in structural disease of the large bowel, impaction of hardened fæces, &c.*

℞. Olei Olivæ, fl. drs. 12; Magnesiæ Sulphatis, gr. 220; Decocti Hordei, ad fl. oz. 12. Mix, for an Enema. The officinal Enema Magnesiæ Sulphatis contains one ounce of Epsom salts and one ounce of olive oil, to fifteen ounces of fluid starch.

℞. Saponis Mollis, oz. 1; Aquæ Calidæ, fl. oz. 12. Mix, for an enema.

189. *Castor Oil and Rue Enema.*

℞. Olei Rutæ, min. 6; Olei Ricini, fl. oz. 1; Tincturæ Assafœtidæ, fl. drs. 2; Decocti Avenæ, fl. oz. 7. Mix. *Exceedingly useful in flatulent colic.*

190. *Castor Oil and Turpentine Enema.*

℞. Olei Ricini, fl. drs. 12; Olei Terebinthinæ, fl. drs. 4; Tincturæ Assafœtidæ, fl. drs. 2; Decocti Avenæ, ad fl. oz. 12. Mix. *In obstinate constipation. It should be thrown up into the bowel by means of a long tube like that of the stomach-pump.*

191. *Croton Oil Enema.*

℞. Olei Crotonis, min. 6; Olei Ricini, fl. oz. 1; Olei Terebinthinæ, fl. drs. 2; Decocti Hordei, ad fl. oz. 6. Mix. *In obstinate constipation. It should be retained for three or four hours, if possible.*

192. *Steel and Aloes Enema.*

℞. Tincturæ Ferri Perchloridi, fl. drs. 1—3; Extracti Quassiæ, gr. 5; Extracti Aloes Barbadensis, gr. 2; Infusi Quassiæ, fl. oz. 8. Mix. *To destroy oxyurides. It has often seemed advantageous to the Author to administer a dose of calomel and scammony at the same time.*

193. *Tobacco Enema.*

℞. Tabaci Communis, gr. 15; Aquæ Bullientis, fl. oz. 8. Mix. *To be employed cautiously in some exceptional cases of strangulated hernia, obstinate constipation, &c.*

194. *Purgative Electuaries.*

℞. Confectionis Sennæ, Potassæ Tartratis Acidæ, Extracti Taraxaci, āā oz. 1. Mix. One teaspoonful to be taken occasionally, an hour before breakfast. *In constipation with inactive liver, or hæmorrhoids.*

℞. Confectionis Piperis, Syrupi Sennæ, Confectionis Sulphuris, āā oz. 1; Pulveris Jalapæ, gr. 30. Mix. One teaspoonful every morning. *In constipation with chronic rheumatism.*

℞. Confectionis Sulphuris, oz. 2; Extracti Taraxaci, oz. 1. Mix and label,—"One teaspoonful daily before breakfast." *In many diseases of the rectum.*

℞. Confectionis Sennæ, oz. 2; Confectionis Scammonii, Syrupi Zingiberis, āā oz. 1; Ferri Carbonatis Saccharatæ, gr. 220. Mix. One teaspoonful early every morning. *In some forms of constipation and want of tone.*

IX. CAUSTICS AND COUNTER-IRRITANTS.

195. *Acid Solution of Nitrate of Mercury.*

℞. Liquoris Hydrargyri Nitratis Acidi, fl. drs. 2; Pulveris Tragacanthæ Compositi, sufficient to make a mass. *To be applied as a paste over the surface to be destroyed. Instead, it is sometimes better to apply the caustic fluid itself for certain cases of cancer or lupus. The solution may also be carefully used to sloughing ulcers, boils, small nævi, &c. It is to be very lightly painted on by means of a glass brush, or a glass rod.*

196. *Chromic Acid.*

℞. Acidi Chromici, gr. 60; Aquæ, fl. drs. 4. Mix. *To destroy warts, small growths of epithelial cancer, &c.*

197. *Chloride of Zinc, &c.*

℞. Bromii Chloridi, Zinci Chloridi, Auri Chloridi, Antimonii Chloridi, of each equal parts. Mix into a paste of sufficient thickness with flour or powdered liquorice. *To destroy cancerous growths. Commonly known as* LANDOLFI'S *paste.*

℞. Sanguinariæ Canadensis, oz. ½—1; Zinci Chloridi, oz. ½—2; Aquæ, fl. oz. 2; Farinæ, sufficient to make a paste. Mix. *The paste thus formed should have the consistence of treacle. This is the caustic which was employed by* DR. FELL.

℞. Zinci Chloridi, gr. 30—60; Farinæ, gr. 120; Aquæ Destillatæ, sufficient to form a mass. To be applied over the diseased surface. Or it may be made into sticks or flèches, and kept dried ready for use. An effectual method of removing a cancerous tumour is to introduce a portion of such a stick into an incision made in the mass.

198. *Supersulphate of Zinc.*

Take half a fluid ounce of sulphuric acid, and saturate it with sulphate of zinc, previously dried and powdered. SIR J. Y. SIMPSON recommended that this caustic should be used by dipping a pen in it, and then drawing lines across the tumour, so as to eat through the skin in a few minutes. The fissures thus made are to be filled with the paste; renewing the scratching and caustic every day or two. In this way, five or eight days may suffice for the removal of a good-sized tumour. By this combination also we can penetrate deeply without hardening the parts, and without fear of producing hæmorrhage.—*This is a very valuable caustic, and has been found particularly useful by the Author for the removal of cancerous tumours of the breast, &c. The pain which it produces will be best mitigated by employing the subcutaneous injection of morphia* (F. 314) *at each application.*

199. *Arsenical Mucilage.*

℞. Acidi Arseniosi, Pulveris Acaciæ, āā oz. 1; Aquæ, fl. drs. 5. Mix. *The late* DR. W. MARSDEN *spoke highly of this caustic in epithelioma; but the Author has had no experience with it, inasmuch as he prefers less dangerous applications. If employed, however, the affected part should be painted over with the mixture night and morning; taking care rigorously to limit the application to the diseased parts, and not to let it extend over more than one superficial inch at a time. As the part sloughs, its separation is to be aided by bread and water poultices; while after all the disease has been got rid of in consequence of the repeated applications of the mucilage, a carrot poultice is to be applied during the night, and a weak black wash* (*calomel gr.* 60 *to lime water one pint*) *during the day until the part is healed.*

200. *Lime and Arsenic Powder.*

℞. Calcis recentis, oz. ½; Arsenici Sulphureti Flavi, gr. 20; Pulveris Amyli, gr. 180. Mix to form a powder. *To be used very cautiously as a depilatory powder. The application is not free from danger.*

201. *Red Oxide of Mercury Powder.*

℞. Hydrargyri Oxidi Rubri, Aluminis, āā gr. 60. Make a powder. *To be sprinkled over exuberant and spongy granulations.*

202. *Carbonate of Copper Ointment.*

℞. Cupri Carbonatis, gr. 60; Adipis Preparati, oz. ½. Mix, to form an ointment. DEVERGIE.—*In chronic eczema and impetigo of the scalp where stimulating applications are required.*

203. *Dupuytren's Arsenic and Calomel Powder.*

℞. Acidi Arseniosi, gr. 12; Hydrargyri Subchloridi, oz. 1. Mix. *In ulcerated lupus. Must be very cautiously used.*

204. *Vienna Caustic.*

℞. Potassæ Causticæ, Calcis, āā oz. 1. Mix thoroughly. *This paste is diluted with alcohol, and applied with a spatula over a small surface. It is identical with the Potassa cum calce of the London Pharmacopœia*—1836.

205. *Iodine Paint.*

℞. Iodinii, gr. 40; Potassii Iodidi, gr. 30; Spiritûs Vini Rectificati, fl. oz. 1. Mix. *To be applied with a camel's hair pencil. Very useful in many chronic pains, &c.*

℞. Iodinii, Potassii Iodidi, āā grs. 20; Collodii, fl. oz. 1. Mix.

℞. Iodinii, gr. 120; Olei Petrolei Albi, fl. oz. 1. Mix. *To be applied with a firm brush. Very useful in ringworm; two or three applications, at intervals of eight or ten days, will frequently effect a cure.*

The officinal LINIMENTUM IODI may also be used, but it must be diluted with from one to three parts of spirit or glycerine or tincture of aconite.

206. *Bromine and Iodine.*

℞. Bromi, min. 5; Iodi, gr. 18; Tincturæ Iodi, fl. oz. 1. Mix very cautiously so as to avoid all risk of an explosion. *To be employed to cancerous and rodent ulcers.*

207. *Croton Oil Liniment.*

℞. Olei Crotonis, min. 30; Olei Olivæ, fl. drs. 2. Mix, for a liniment. *To produce rubefaction and a pustular eruption, where counter-irritation is required for the relief of diseases of internal organs.* The officinal liniment is only 1 part to 7, and is scarcely strong enough.

208. *Blistering and Epispastic Papers.*

These papers of M. Albespeyre have long been used in this country with great advantage, though they are less appreciated than in France.

They consist of—an epispastic paper for dressing blisters; a dulcifying paper for issues, causing neither smell nor pain; and blisters formed of an adhesive cloth without a plaster.

The Epispastic Paper, for dressing blisters, is prepared of four degrees of strength, under the designation of No. 1 feeble, No. 1, No. 2, and No. 3. No. 1 feeble possesses the least strength, and is suitable as a dressing for persons of irritable temperament, and for children. No. 1 has rather more salve spread upon it, and is adapted for patients whose blisters have risen well. No. 2 is employed for those whose blisters do not draw sufficiently, and require stimulating. Whilst No. 3 possesses a still stronger power, and is used only in cases where the blister has a tendency to dry up. They all maintain an abundant discharge, without pain or heat; prevent the formation of false membranes; produce no irritation of the urinary passages; and cause no disagreeable smell.

The blisters—applied by the adhesive black side—readily adhere to the skin, producing vesication in a few hours (twelve at the furthest); and, if necessary, the same piece put on four or five times always gives rise to the blistering effect. They are, however, less required by British practitioners than they were prior to 1867, because there is now an excellent officinal CHARTA EPISPASTICA.

X. DIAPHORETICS AND DIURETICS.

209. *Nitre and Ipecacuanha.*

℞. Potassæ Nitratis, gr. 60, *vel* Potassæ Citratis, gr. 120; Vini Ipecacuanhæ, fl. drs. 2; Syrupi Hemidesmi, fl. oz. 1; Decocti Hordei, ad O. 1. Mix. One small teacupful to be taken every two or three hours. *In severe catarrh with sore throat.*

210. *Antimony and Opium.*

℞. Vini Antimoniale, fl. drs. 1—2; Liquoris Ammoniæ Acetatis, fl. drs. 12; Extracti Opii Liquidi, min. 30; Aquæ Camphoræ, ad fl. oz. 8. Mix. One-sixth part three times a day. *Each fluid drachm of the wine contains one-quarter of a grain of antimony.*

211. *Citrate of Potash and Ammonia.*

℞. Potassæ Citratis, gr. 120; Liquoris Ammoniæ Acetatis, fl. drs. 18; Spiritûs Ammoniæ Aromatici, fl. drs. 3; Tincturæ Aconiti, min. 30; Aquæ, ad fl. oz. 8. Mix. One-sixth part every four or six hours. *In pneumonia, and many other acute inflammations. Sometimes it is preferable to give only the Solution of Acetate of Ammonia diluted with water* (*two or three fluid drachms to two ounces*).

212. *Ether and Ammonia.*

℞. Potassæ Nitratis, gr. 30—60; Spiritûs Ætheris Nitrosi, fl. drs. 3; Liquoris Ammoniæ Acetatis, fl. drs. 12; Aquæ Camphoræ, ad fl. oz. 8. Mix. One sixth part three or four times a day. *In the early stage of many febrile and inflammatory disorders.*

℞. Ammoniæ Carbonatis, gr. 18—30; Spiritûs Chloroformi, fl. drs. 3; Vini Colchici, min. 30; Liquoris Ammoniæ Acetatis, fl. drs. 20; Mucilaginis Tragacanthæ, fl. oz. 4; Aquæ, ad fl. oz. 8. Mix. One-sixth part every four hours. *Valuable in some forms of pneumonia, gouty inflammation, &c.*

213. *Dover's Powder and Antimony, &c.*

℞. Pulveris Ipecacuanhæ Compositi, gr. 5; Antimonii Tartarati, gr. ¼. Mix, and make a powder to be taken every six hours.

℞. Pulveris Opii, Pulveris Ipecacuanhæ, āā gr. 1; Potassæ Nitratis, gr. 8. Make a powder, to be taken every night at bedtime. *An improvement on the ordinary Dover's powder.*

214. *Senega and Guaiac.*

℞. Tincturæ Guaiaci Ammoniatæ, fl. drs. 3—6; Mucilaginis Tragacanthæ, fl. oz. 8. Mix thoroughly together, and then add,—Infusi Senegæ, ad fl. oz. 8. Three tablespoonfuls to be taken thrice daily. *Useful in the latter stages of bronchitis, tonsillitis, &c. The action is diaphoretic, diuretic, stimulant, and expectorant.*

℞. Tincturæ Guaiaci Ammoniatæ, fl. drs. 2; Vitelli Ovi, 1. Beat thoroughly together, and then add,—Misturæ Amygdalæ, fl. oz. 4. Direct, one half to be taken twice a day. *In chronic rheumatism.*

215. *Benzoate of Ammonia and Juniper.*

℞. Ammoniæ Benzoatis, gr. 60—120; Syrupi Hemidesmi, fl. oz. 1; Spiritûs Juniperi, fl. drs. 6; Aquæ, ad fl. oz. 8. Mix. One-sixth part three times a day. *As a diuretic in dropsy and gout. In cases where the urine is loaded with phosphates. Also in catarrhal inflammation of the bladder with alkaline urine.*

216. *Ipecacuanha and Syrup of Poppies.*

℞. Vini Ipecacuanhæ, fl. drs. 2; Syrupi Papaveris, fl. drs. 3; Mucilaginis Tragacanthæ, fl. oz. 1; Aquæ, ad fl. oz. 3. Mix. One teaspoonful every two or three hours. *An infantile cough mixture.*

217. *Antimony and Ipecacuanha.*

℞. Vini Antimoniale, min. 75; Vini Ipecacuanhæ, fl. drs. 2; Syrupi Rhœados, fl. drs. 3; Liquoris Ammoniæ Acetatis, fl. drs. 2; Aquæ, ad fl. oz. 6. Mix. A small tablespoonful every two hours. *A depressing mixture for children two or three years of age.*

218. *Ipecacuanha and Syrup of Poppies.*

℞. Vini Ipecacuanhæ, fl. drs. 2; Syrupi Papaveris, fl. drs. 3; Liquoris Ammoniæ Acetatis, fl. drs. 4; Spiritûs Ætheris Nitrosi, fl. drm. 1; Aquæ, ad fl. oz. 2. Mix. One teaspoonful every two or three hours. *In the early stage of infantile fever, severe catarrh, bronchitis, and pneumonia.*

219. *Squills, Digitalis, Broom, &c.*

℞. Potassæ Acetatis, gr. 120; Syrupi Scillæ, fl. drs. 6; Spiritûs Ætheris Nitrosi, fl. drs. 3; Tincturæ Digitalis, min. 30—fl. drm. 1; Succi Scoparii, fl. drs. 6; Aquæ, ad fl. oz. 8. Mix. One-sixth part every six or eight hours. *As a diuretic in dropsy dependent upon disease of the heart, liver, or peritoneum.*

℞. Tincturæ Scillæ, fl. drs. 2; Tincturæ Camphoræ Compositæ, fl. drs. 4; Liquoris Ammoniæ Acetatis, fl. drs. 12; Decocti Scoparii, ad fl. oz. 8. Mix. One-sixth part three times a day. *Diuretic and diaphoretic. In dropsies unaccompanied by inflammation, and not due to renal disease.*

℞. Spiritûs Juniperi, fl. drs. 4; Potassæ Tartratis Acidæ, oz. 1; Decocti Scoparii, ad fl. oz. 12. Mix. One-sixth part three times a day. *Diuretic and laxative.*

℞. Pulveris Scillæ, gr. 6; Digitalis Foliæ, gr. 8—12; Pilulæ Hydrargyri, gr. 30. Make a mass, divide into twelve pills, and order one to be taken night and morning with a wineglassful of the DECOCTUM SCOPARII. See F. 224.

℞. Liquoris Potassæ, fl. drs. 1—2; Spiritûs Ætheris Nitrosi, fl. drs. 6; Tincturæ Croci, fl. drs. 3; Infusi Digitalis, fl. drs. 12; Syrupi, fl. drs. 6; Aquæ, ad fl. oz. 8. Mix. One-sixth part three times a day. *A valuable diuretic in some forms of cardiac and hepatic dropsy.*

220. *Copaiba Resin.*

℞. Resinæ Copaibæ, gr. 90; Spiritûs Vini Rectificati, fl. drs. 2; Spiritûs Chloroformi, fl. drm. 1; Misturæ Acaciæ, fl. oz. 1; Aquæ, ad fl. oz. 6. Mix. One-sixth part three times a day. *As a diuretic in ascites.*

221. *Nitre, Juniper, and Ether.*

℞. Potassæ Nitratis, gr. 60; Spiritûs Juniperi, fl. drs. 1—2; Spiritûs Ætheris Nitrosi, fl. drs. 3; Decocti Chimaphilæ (Phar. Lond. 1851), ad fl. oz. 8. Mix. One-sixth part every six hours. *A tonic and stimulating diuretic. In scrofula, atonic dropsies, catarrhal inflammation of the bladder, and some skin diseases.*

222. *Buchu, and Cream of Tartar.*

℞. Potassæ Tartratis Acidæ, gr. 180; Infusi Buchu, fl. oz. 8. Mix. One-sixth part three times a day. *Diuretic and laxative. In irritable conditions of the bladder, owing to excess of uric acid in the urine. Also in chronic rheumatism, dropsy, and some cutaneous diseases.*

223. *Buchu, Borax, and Pareira.*

℞. Boracis, gr. 40; Tincturæ Buchu, fl. drs. 6; Extracti Pareiræ Liquidi, fl. drs. 6; Decocti Pareiræ, ad fl. oz. 8. Mix. One-sixth part every six or eight hours. *In chronic catarrh of the bladder, calculous affections, &c.*

224. *Digitalis, Squills, &c.*

℞. Potassæ Citratis, gr. 200; Tincturæ Scillæ, fl. drs. 2; Vini Colchici, fl. drs. 1½; Liquoris Ammoniæ Acetatis, fl. drs. 12; Infusi Digitalis, fl. oz. 3; Aquæ Menthæ Piperitæ, ad fl. oz. 8. Mix. One-sixth part three times a day. *Diuretic and sedative. In some forms of dropsy with disease of the mitral valve.*

℞. Digitalis Foliæ, Pulveris Scillæ, āā gr. 12; Extracti Taraxaci, gr. 36. Make a mass, divide into twelve pills, and order one to be taken twice a day. *Valuable as a diuretic in mitral, but injurious in aortic, disease.* See F. 219.

225. *Urea.*

℞. Ureæ, gr. 5—15; Syrupi Aurantii, fl. drm. 1; Aquæ, fl. oz. 2. Make a draught, to be taken every six hours. *Recommended by the Author as a diuretic in dropsy due to cardiac disease.* See *Medical Times and Gazette,* 8 May, 1852.

226. *Cantharides and Nitrous Ether.*

℞. Tincturæ Cantharidis, fl. drs. 1—2; Spiritûs Ætheris Nitrosi, fl. drs. 3; Spiritûs Juniperi, fl. drs. 4; Syrupi Zingiberis, fl. drs. 6; Aquæ, ad fl. oz. 8. Mix. One sixth part three times a day. *May be cautiously tried in some cases of suppression of urine. Also in some skin diseases.*

227. *Taraxacum and Nitric Acid.*

℞. Acidi Nitrici Diluti, fl. drm. 1; Succi Taraxaci, fl. drs. 6; Decocti Taraxaci, ad fl. oz. 8. Mix. One-sixth part three times a day. *Laxative, alterative, and diuretic. Especially useful in disease of the liver unaccompanied by inflammation.*

228. *Cream of Tartar and Taraxacum.*

℞. Potassæ Tartratis Acidæ, oz. 1; Extracti Taraxaci, gr. 30; Decocti Taraxaci, fl. oz. 8. Mix. One-sixth part three times a day. *In jaundice independent of hepatitis or obstruction of the duct of the gall bladder.*

229. *Oil of Juniper.*

℞. Olei Juniperi, min. 20; Syrupi Limonis, fl. drs. 6; Mucilaginis Acaciæ, fl. oz. 4; Aquæ, ad fl. oz. 12. Mix. One-sixth part every six or eight hours. *The oil of juniper has not only a diuretic action, but it is also a diaphoretic and an emmenagogue and a cathartic. In too large doses it may cause inflammation of the bladder.*

230. *Conium, Digitalis, and Calomel.*

℞. Digitalis Foliæ, Hydrargyri Subchloridi, āā gr. 5; Extracti Conii, gr. 60. Make a mass, divide into fifteen pills, and order one to be taken three times a day. *As a sedative and diuretic in dropsy from cardiac disease.*

XI. EMETICS AND EXPECTORANTS.

231. *Depressing Emetics.*

℞. Antimonii Tartarati, gr. 1—2; Vini Ipecacuanhæ, fl. drs. 2; Aquæ, ad fl. oz. 2. Make a draught, to be taken immediately. *Its action should be aided by the free administration of warm water.*

℞. Antimonii Tartarati, gr. 1; Pulveris Ipecacuanhæ, gr. 20. Make a powder. To be taken in honey or cream, or as a bolus in wafer paper.

℞. Vini Ipecacuanhæ, fl. oz. 1. To be taken when it is desired to induce vomiting. *For children one fluid drachm, in tea or sweetened water, will generally suffice.*

℞. Chloride of Apomorphia, in doses of gr. $\frac{1}{5}$ by the mouth, or of gr. $\frac{1}{10}$ injected subcutaneously, is a prompt and unfailing emetic.

232. *Stimulant Emetics.*

℞. Pulveris Sinapis, oz. $\frac{1}{2}$; Aquæ, fl. oz. 3. Make a draught. To be taken immediately.

℞. Cupri Sulphatis, gr. 10; Aquæ, fl. oz. 3. Make an emetic draught.

℞. Zinci Sulphatis, gr. 20—40; Aquæ, fl. oz. 3. Mix.

233. *A Warm Emetic.*

℞. Pulveris Ipecacuanhæ, Ammoniæ Carbonatis, āā gr. 20; Tincturæ Lavandulæ Compositæ, fl. drm. 1; Aquæ, fl. oz. 2. Make a draught. After taking it a tumblerful of infusion of Chamomile Flowers (Infusion Anthemidis) should be drunk. *Suggested by a formula of* Dr. Druitt's. *In the incipient stages of fever, erysipelas, &c.*

234. *Tartar Emetic Mixture.*

℞. Antimonii Tartarati, gr. 2; Syrupi Rhœados, Aquæ, āā fl. drs. 4. Mix and label,—"One teaspoonful every two hours, in a wineglassful of water, until there is nausea."—*As a depressant to the circulating and nervous systems.*

235. *Ammonia and Senega.*

℞. Ammoniæ Carbonatis, gr. 30; Spiritûs Ætheris, fl. drs. 3; Tincturæ Scillæ, fl. drs. 2; Tincturæ Camphoræ Compositæ, fl. drs. 2—4; Tincturæ Lavandulæ Compositæ, fl. drs. 6; Infusi Senegæ, ad fl. oz. 8. Mix. Two tablespoonfuls every four hours. *In the chronic bronchitis of old people.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. 4; Spiritûs Armoraciæ Compositi, min. 60; Tincturæ Senegæ, fl. drs. 6; Aquæ Camphoræ, ad fl. oz. 8. Mix. One-sixth part every six hours. *A valuable stimulating expectorant in some cases of chronic bronchitis.*

℞. Ammoniæ Carbonatis, gr. 12; Vini Ipecacuanhæ, min. 40; Tincturæ Senegæ, fl. drs. 2; Syrupi Rhœados, fl. drs. 3; Aquæ, ad fl. oz. 3. Mix. One dessertspoonful every two or three hours. *An excellent stimulating expectorant for young children recovering from croup. In hooping cough, where the bronchi are loaded with mucus.*

236. *Squills, Nitric Acid, and Bark or Steel.*

℞. Syrupi Scillæ, fl. drs. 6; Acidi Nitrici Diluti, fl. drm. 1; Tincturæ Hyoscyami, fl. drs. 3—6; Spiritûs Chloroformi, fl. drs. 2; Infusi Cinchonæ Flavæ, ad fl. oz. 8. Mix. One-sixth part twice or thrice daily. *In chronic catarrh with debility and restlessness.*

℞. Syrupi Scillæ, fl. drs. 6; Tincturæ Ferri Muriatis, fl. drm. 1; Tincturæ Camphoræ Compositæ, fl. drs. 3—6; Spiritûs Chloroformi, fl. dr. 1; Aquæ, ad fl. oz. 6. Mix. One-sixth part three times a day. *In chronic catarrh with debility.* Sometimes 5 or 10 drops of Oleum Terebinthinæ may be added with advantage.

237. *Ammoniacum and Opium.*

℞. Tincturæ Scillæ, fl. drs. 2; Extracti Opii Liquidii, min. 20—30; Syrupi Tolutani, fl. drs. 6; Misturæ Ammoniaci, ad fl. oz. 6. Mix. One-sixth part three times a day. *A sedative and expectorant mixture in the chronic bronchitis of elderly people.*

238. *Sarsaparilla and Squills.*

℞. Extracti Sarsæ Liquidi, Syrupi Scillæ, āā fl. drs. 12. Mix, and label,—"One teaspoonful in a teacupful of barley water frequently during the day." *An agreeable demulcent and expectorant in inflammation of the mucous membranes about the throat and air passages.*

239. *Squills, Ammonia, and Morphia.*

℞. Syrupi Scillæ, fl. drs. 6; Spiritûs Ammoniæ Aromatici, fl. drs. 3; Liquoris Morphiæ Hydrochloratis, fl. drm. 1 (equivalent to half a grain of the salt); Infusi Serpentariæ, ad fl. oz. 8. Mix. One-sixth part twice or thrice a day. *In chronic catarrh.*

240. *Antimony and Ether.*

℞. Vini Antimoniale, fl. drs. 1½; Spiritûs Ætheris, fl. drs. 3; Mucilaginis Tragacanthæ, fl. oz. 3; Aquæ, ad fl. oz. 6. Mix. One-sixth part every four hours. *The quantity of antimonial wine should be doubled when it is desirable to induce a feeling of nausea.*

241. *Ipecacuanha and Indian Sarsaparilla.*

℞. Vini Ipecacuanhæ, fl. drs. 2; Syrupi Hemidesmi, fl. drs. 3; Mucilaginis Acaciæ, fl. oz. 1; Aquæ, ad fl. oz. 2. Mix. One teaspoonful every two hours. *For children threatened with an attack of croup or bronchitis.*

℞. Vini Ipecacuanhæ, fl. drs. 2; Syrupi Hemidesmi, fl. oz. 1; Infusi Lini, ad fl. oz. 8. Mix. One-sixth part every four hours. *An emollient and expectorant in catarrh.*

242. *Indian Tobacco and Hemlock.*

℞. Tincturæ Lobeliæ Æthereæ, fl. drs. 3; Syrupi Papaveris, fl. drs. 6; Tincturæ Conii Fructus, fl. drs. 2—4; Misturæ Amygdalæ, ad fl. oz. 6. Mix. One-sixth part every four hours. *In spasmodic cough, and some forms of asthma.*

243. *Squills and Hemlock or Hyoscyamus.*

℞. Pilulæ Scillæ Compositæ, Extracti Conii, āā gr. 30. Make a mass, divide into 12 pills, and order two to be taken every night at bedtime. *In chronic catarrh when opium is objectionable.*

℞. Syrupi Scillæ, fl. drs. 6; Spiritûs Ætheris Nitrosi, Tincturæ Hyoscyami, āā fl. drs. 3; Infusi Rosæ Acidi, ad fl. oz. 8. Mix. One-sixth part every six hours. *In influenza, catarrh, &c.*

244. *Nitrous Ether, Ipecacuanha, and Hemlock.*

℞. Vini Ipecacuanhæ, fl. drs. 1½; Spiritûs Ætheris Nitrosi, fl. drs. 6; Succi Conii, fl. drs. 3; Infusi Senegæ, ad fl. oz. 8. Mix. One-sixth part every six hours. *In chronic bronchitis, when an expectorant and sedative is required.*

245. *Dulcamara and Stramonium.*

℞. Tincturæ Scillæ, fl. drs. 2; Tincturæ Stramonii, fl. drs. 1½; Infusi Dulcamaræ, ad fl. oz. 8. Mix. One-sixth part three times a day. *In chronic catarrh and rheumatism, especially where the secretions of the skin and kidneys are deficient.*

246. *Benzoic Acid and Squills.*

℞. Acidi Benzoici, gr. 40; Syrupi Scillæ, Syrupi Rhœados, āā fl. drs. 12. Make a linctus, of which one small teaspoonful is to be ordered to be taken every four hours. *In chronic bronchial affections with suppressed action of the liver.* See F. 49.

247. *Opium and Squills.*

℞. Syrupi Scillæ, Syrupi Papaveris, Syrupi Tolutani, Mucilaginis Tragacanthæ, āā fl. drs. 4. Make a linctus, of which a teaspoonful is to be directed to be taken frequently.

℞. Syrupi Scillæ, fl. drs. 10; Tincturæ Conii, fl. drs. 2; Tincturæ Camphoræ Compositæ, fl. drs. 4. Make a linctus, and order one teaspoonful to be taken when the cough is troublesome. See F. 346, 347.

XII. GARGLES AND INHALATIONS.

248. *Hydrochloric Acid Gargle, &c.*

℞. Acidi Hydrochlorici Diluti, fl. drs. 3; Mellis Depurati, oz. 1; Infusi Rosæ Acidi, ad fl. oz. 8. Mix. *In tonsillitis after the acute stage, and in relaxed sore throat.*

249. *Zinc and Rhatany Gargle.*

℞. Zinci Sulphatis, gr. 20; Syrupi Mori, fl. drs. 4; Glycerini, fl. oz. 1; Infusi Krameriæ, ad fl. oz. 8. Mix. *For relaxation of the uvula and fauces.*

250. *Borax Gargles.*

℞. Boracis, gr. 160; Tincturæ Myrrhæ, fl. oz. 1; Aquæ, ad fl. oz. 8. Mix. *Useful in aphthæ and ulcerations about the fauces.*

℞. Boracis, gr. 120; Glycerini, fl. oz. 1. Mix. To be painted over the gums, tongue, &c., with a camel's-hair pencil. *In aphthæ. It is preferable to the officinal* BORAX HONEY, *as the sugar of the latter favours the formation of fungi.*

℞. Boracis, gr. 60; Glycerini, fl. drs. 12; Aquæ Rosæ, ad fl. oz. 4. Mix. *To be painted over the tongue in some forms of ulceration, fissure, &c.*

℞. Boracis, gr. 180; Syrupi Scillæ, fl. drs. 1; Aquæ, ad fl. oz. 8. Mix. *As a gargle in chronic inflammation of the fauces.*

251. *Tannin Gargle.*

℞. Acidi Tannici, gr. 20; Spiritûs Vini Gallici, fl. oz. 1; Aquæ Camphoræ, ad fl. oz. 8. Mix. The officinal TANNIC ACID LOZENGES may be used at the same time.

℞. Tincturæ Myrrhæ, fl. drs. 4; Acidi Tannici, gr. 35; Eau de Cologne, fl. drs. 12. Mix. *The gums are to be sponged with this preparation three or four times a day in cases of chronic gingivitis, ulceration, loosening of the teeth, &c.*

252. *Alum Gargles.*

℞. Aluminis Exsiccati, gr. 80; Tincturæ Myrrhæ, fl. oz. 1; Aquæ, ad fl. oz. 8. Mix. *In mercurial salivation, ulceration about the mouth and fauces, &c.*

℞. Aluminis Exsiccati, gr. 60; Tincturæ Capsici, fl. drs. 3; Syrupi Mori, fl. oz. 1; Aquæ Rosæ, ad fl. oz. 8. Mix. *In hoarseness, sore throat, &c., with relaxation of the uvula or tonsils.*

253. *Opium and Belladonna Gargle.*

℞. Tincturæ Opii, fl. drs. 2; Tincturæ Belladonnæ, fl. drs. 3; Aquæ Camphoræ, ad fl. oz. 8. Mix. *To be used frequently in acute tonsillitis.*

254. *Chlorinated Soda Gargle.*

℞. Liquoris Sodæ Chloratæ, fl. drs. 6; Aquæ, ad fl. oz. 8. Mix. *In ulcerated sore throats, profuse salivation, &c. It may also be used as a lotion to foul gangrenous ulcers, as well as to the seat of irritation in prurigo.*

255. *Creasote Gargles.*

℞. Creasoti, min. 20; Mucilaginis Tragacanthæ, fl. oz. 3; Aquæ, ad fl. oz. 8. Mix.

℞. Creasoti, min. 20; Tincturæ Lavandulæ Compositæ, Tincturæ Myrrhæ, āā fl. drs. 4; Syrupi Limonis, fl. drs. 12; Aquæ, ad fl. oz. 8. Mix. *In chronic inflammation of the throat, dysphonia clericorum, &c.*

256. *Corrosive Sublimate Gargles.*

℞. Hydrargyri Perchloridi, gr. 2; Acidi Nitrici Diluti, min. 30; Tincturæ Myrrhæ, fl. oz. 1; Aquæ Destillatæ, ad fl. oz. 8. Mix.

℞. Hydrargyri Perchloridi, gr. 3; Glycerini, fl. oz. 1; Extracti Conii, gr. 60; Aquæ Destillatæ, ad fl. oz. 8. Mix. *Useful in syphilitic affections of the tongue and throat. The patient must use one tablespoonful at a time, and should be cautioned against swallowing it.*

257. *Permanganate of Potash Gargle.*

℞. Liquoris Potassæ Permanganatis, fl. oz. 1; Potassæ Chloratis, gr. 100; Aquæ Destillatæ, ad fl. oz. 8. Mix. *In diphtheria, ulceration of fauces, &c.*

258. *Sulphite of Soda.*

℞. Sodæ Sulphitis, gr. 60; Aquæ Destillatæ, fl. oz. 1. Mix. To be frequently applied by means of a camel's-hair pencil to the mucous membrane of the mouth and fauces. *In cases of aphthæ.*

259. *Iodine Inhalation.*

℞. Tincturæ Iodi, min. 30; Aquæ Calidæ, fl. oz. 4. Mix. The vapour is to be cautiously inhaled. *In some cases of laryngeal phthisis, diphtheria, &c.*

In *severe coryza* great relief is given by holding a small bottle of Tincture of Iodine under the nose. The warmth of the hand suffices to vaporize the iodine.

260. *Turpentine and Creasote Inhalations.*

℞. Olei Terebinthinæ, fl. oz. 1; Aquæ Calidæ, ad fl. oz. 6. Mix. *In chronic bronchitis with excessive secretion. To be used with a common inhaler.*

℞. Creasoti, min. 30; Aquæ Bullientis, fl. oz. 8. Mix. *In ozœna and other affections of the nostrils, pharynx, &c.*

261. *Hydrocyanic Acid Inhalations.*

℞. Acidi Hydrocyanici Diluti, min. 20; Tincturæ Hyoscyami, Tincturæ Lupuli, āā fl. oz. 1; Aquæ Calidæ, ad fl. oz. 8. Mix. *In phthisis, ulceration of the larnyx, &c. Can be used with any common inhaler.*

℞. Acidi Hydrocyanici Diluti, min. 15; Spiritûs Chloroformi, fl. drs. 3—6; Aquæ Bullientis, fl. oz. 8. Mix. *In laryngitis, œdema of the glottis, &c.*

262. *Atomised Fluids for Inhalation.*

The following drugs may be used in the form of spray. The dose mentioned is to be added to one ounce of water :—

Acidum Carbolicum . .	grs. 1 to 2	Liquor Arsenicalis . .	min. 3 to 8
Acidum Sulphurosum .	fl. drs. 2 to 8	Liquor Calcis Saccharatus	fl. drs. 1 to 4
Acidum Tannicum . .	grs. 3 to 12	Oleum Terebinthinæ .	min. 1 to 5
Alumen Exsiccatum .	grs. 3 to 20	Potassæ Chloras . . .	grs. 5 to 10
Aqua Laurocerasi . .	min. 5 to 20	Potassæ Permanganas .	grs. 2 to 4
Argenti Nitras . . .	grs. 1 to 3	Potassii Bromidum . .	grs. 2 to 10
Borax	grs. 5 to 20	Potassii Iodidum . . .	grs. 2 to 10
Extractum Belladonnæ .	gr. $\frac{1}{4}$ to 1	Sodii Chloridum . . .	grs. 5 to 40
Extractum Conii . . .	grs. 5 to 10	Tinctura Ferri Perchloridi	min. 5 to 30
Extractum Cannabis Indicæ	gr. $\frac{1}{4}$ to 1	Tinctura Iodi	min. 1 to 15
Extractum Opii . . .	gr. $\frac{1}{4}$ to 2	Tinctura Opii	min. 3 to 20
Ferri Ammonio-Sulphas	grs. 3 to 6	Zinci Sulphas	grs. 3 to 15
Hydrargyri Perchloridum	gr. $\frac{1}{16}$ to $\frac{1}{8}$		

The best instruments for dispersing the finest spray are—Dr. Siegle's, in which steam is applied as the dispersing medium: a modification of this apparatus, made by Krohne and Sesemann, of 241, Whitechapel Road: Dr. Bergson's or Dr. Andrew Clarke's double handball spray producer: Mr. Maunder's single handball.

Atomised medicated fluids may be advantageously used in affections of the lining membrane of the nose, mouth, and fauces. In croup and diphtheria: Syphilitic affections of palate and throat: Laryngitis: Tonsillitis: Œdema of the glottis: Tubercular or syphilitic ulcerations of larynx: Hoarsenesss and loss of voice: Hooping cough: Asthma: Hæmoptysis: Bronchitis: Phthisis. During their application the patient should make deep and long inspirations and expirations. Except in acute cases one application daily will suffice. In addition to the drugs mentioned above, pure glycerine may be used; or olive oil, or even cod liver oil; or plain warm water; or the undiluted sulphurous acid (in diphtheria).

XIII. LOTIONS, LINIMENTS, COLLYRIA, AND OINTMENTS.

263. *Hydrocyanic Acid Lotions.*

℞. Acidi Hydrocyanici Diluti, fl. drs. 3; Plumbi Acetatis, gr. 60; Spiritûs Rectificati, fl. oz. 1; Aquæ Sambuci, ad fl. oz. 8. Mix. *In impetigo, prurigo, &c.*

℞. Liquoris Potassæ, fl. drs. 2; Acidi Hydrocyanici Diluti, fl. drs. 1½; Glycerini, fl. oz. 1; Aquæ Rosæ, ad fl. oz. 8. *In some cases of pityriasis.*

℞. Liquoris Ammoniæ Acetatis, fl. oz. 1; Acidi Hydrocyanici Diluti, fl. drs. 1½; Infusi Tabaci (made with sixty grains of Bird's-eye tobacco), ad fl. oz. 8. Mix. To be sponged twice or thrice daily over the seat of irritation. *In pruritus about the anus, vulva, &c.*

℞. Hydrargyri Perchloridi, gr. 3; Acidi Hydrocyanici Diluti, fl. drs. 2; Misturæ Amygdalæ, ad fl. oz. 8. Mix. *To check irritation in prurigo and other skin diseases of limited extent.*

264. *Astringent Lotions.*

℞. Glycerini, fl. oz. 1; Liquoris Plumbi Subacetatis, fl. drs. 2; Spiritûs Rectificati, fl. drs. 4; Aquæ Rosæ, ad fl. oz. 8. Mix. *In eczema, ecthyma, pityriasis, &c.*

℞. Zinci Sulphatis, gr. 16; Spiritûs Rosmarini, Tincturæ Lavandulæ Compositæ, āā fl. drs. 2; Aquæ, ad fl. oz. 8. Mix. *The common "Red Lotion" of Hospitals. Very useful for strumous and other ulcers.*

℞. Potassæ Chloratis, gr. 80; Aquæ, fl. oz. 8. Mix. *For many ill-conditioned ulcers.*

℞. Acidi Citrici, gr. 120; Aquæ, fl. oz. 8. Mix. *For cancerous sores. Also as a gargle in cancer of the tongue or tonsil.* It relieves pain, and encourages cicatrization.

265. *Anodyne Lotions.*

℞. Tincturæ Aconiti, fl. drs. 12; Aquæ, ad fl. oz. 4. Mix. *In acute superficial pain, hyperæsthesia of skin, gout, pruritus, &c.*

℞. Tabaci Communis (Bird's-eye tobacco), gr. 120; Aquæ Bullientis, O. 1. Infuse for an hour, and strain. *To be freely used in pruritus of the vulva or anus.*

℞. Tincturæ Belladonnæ, fl. oz. 1; Spiritûs Chloroformi, fl. oz. 2; Aquæ Destillatæ, ad fl. oz. 8. Mix.

℞. Extracti Belladonnæ, gr. 120; Glycerini, fl. oz. 1. Mix. *To be painted over the seat of pain in neuralgic diseases, and in limited inflammations.* The mixture is to be made of double the strength, if required as an application to the breasts to check the secretion of milk.

266. *Alkaline and Anodyne Lotions.*

℞. Liquoris Morphiæ Hydrochloratis, fl. oz. 1½; Liquoris Potassæ, fl. drs. 2; Glycerini, fl. oz. 1; Aquæ Laurocerasi, fl. oz. 1; Aquæ Sambuci, ad fl. oz. 12. Mix. *For the relief of pruriginous affections.*

℞. Potassæ Sulphuratæ, gr. 90; Liquoris Potassæ, min. 30; Tincturæ Aconiti, fl. drs. 4; Aquæ Destillatæ, ad fl. oz. 12. Mix.

267. *Acid and Anodyne Lotion.*

℞. Acidi Acetici, fl. drs. 1½; Morphiæ Acetatis, gr. 10; Vini Colchici, fl. oz. 3. Mix. *To be applied over the inflamed joint in gout, on a piece of lint covered with oiled silk.*

268. *Borax or Soda, and Glycerine Lotions.*

℞. Boracis, gr. 60—120; Glycerini, fl. oz. 1; Aquæ Sambuci, ad fl. oz. 8. Mix. *An excellent local palliative in many of the squamous diseases of the skin.*

℞. Boracis, gr. 200; Morphiæ Hydrochloratis, gr. 10; Glycerini, fl. oz. 1; Aquæ Rosæ, ad fl. oz. 8. Mix. *In obstinate pruritus of the vulva. The parts to be sponged twice or thrice in the twenty-four hours with this lotion, previously washing them with glycerine (or honey) soap and warm water.*

℞. Sodæ Carbonatis, gr. 120; Aquæ Sambuci, fl. oz. 7; Glycerini, fl. oz. 1. Mix. *To allay the itching attendant on many skin diseases, healing ulcers, &c.*

269. *Iodine Lotions.*

℞. Tincturæ Iodi, fl. oz. 1; Glycerini, fl. drs. 12; Aquæ Destillatæ, ad fl. oz. 8. Mix. *For indolent and scrofulous ulcers, &c.*

℞. Linimenti Iodi, fl. drs. 4; Tincturæ Aconiti, fl. oz. 1; Aquæ Destillatæ, ad fl. oz. 8. Mix. *In some cases of chronic peritonitis; chronic pleurisy with effusion; chronic effusions into joints, &c.* See F. 81.

270. *Creasote or Carbolic Acid, and Glycerine.*

℞. Creasoti, min. 35; Glycerini, fl. drs. 12; Aquæ, ad fl. oz. 8. Mix, for a lotion. *In pityriasis, &c.*

℞. Acidi Carbolici, gr. 100; Glycerini, fl. oz. 1; Aquæ, ad fl. oz. 8. Mix, for a lotion. *In parasitic and pruriginous affections.*

℞. Glycerini Acidi Carbolici, fl. oz. 1; Aquæ, fl. oz. 4. Mix. The affected part to be sponged with this lotion three or four times in the 24 hours. *In all parasitic skin diseases.*

271. *Corrosive Sublimate Lotions.*

℞. Hydrargyri Perchloridi, gr. 8—16; Aquæ Sambuci, fl. oz. 8. Mix. *Useful in tinea favosa, and other parasitic skin diseases.*

℞. Hydrargyri Perchloridi, gr. 10; Ammonii Chloridi, gr. 60; Acidi Hydrocyanici Diluti, min. 100; Liquoris Morphiæ Hydrochloratis, fl. oz. 2. Mix. Label,—"One teaspoonful to be added to a wineglassful of water to form a lotion." *In pruritus of the vulva or anus.*

℞. Hydrargyri Perchloridi, gr. 4; Acidi Nitrici Diluti, min. 30; Spiritûs Vini Rectificati, fl. drs. 4; Aquæ Sambuci, ad fl. oz. 8. Mix and label,—"To be sponged upon the spots and rough surfaces night and morning." *In chloasma, some forms of acne, &c.*

272. *Sulphurous Acid and Sulphocyanide Lotion.*

℞. Acidi Sulphurosi, fl. oz. 2; Aquæ Destillatæ, fl. oz. 6. Mix. *In skin diseases dependent on a parasitic plant.*

℞. Acidi Sulphurosi, Glycerini, āā fl. oz. 1. Mix. *In ringworm, favus, and for the destruction of parasitic lichens.* Should be painted over the affected parts.

℞. Potassii Sulphocyanidi, gr. 240; Glycerini, fl. oz. 1; Aquæ, fl. oz. 7. Mix. In ringworm, &c. To be well rubbed into the diseased patch, after careful washing and drying, and also applied on lint. DR. GEE.

273. *Cold Lotions.*

℞. Liquoris Ammoniæ Acetatis, fl. oz. 1; Spiritûs Rectificati, fl. oz. 2; Aquæ Rosæ, ad fl. oz. 8. Mix. *As an evaporating lotion in inflammation of the membranes of the brain. To be applied after the scalp has been shaved.*

℞. Ammonii Chloridi, oz. ½; Spiritûs Rectificati, fl. oz. 1; Acidi Acetici Diluti, fl. drs. 12; Aquæ, ad fl. oz. 8. Mix.

274. *Absorbent Lotions.*

℞. Zinci Oxidi, gr. 160; Aquæ Rosæ, ad fl. oz. 8. Mix. *Useful in impetigo, eczema, &c.*

℞. Zinci Oxidi, gr. 160; Mucilaginis Tragacanthæ, Aquæ Destillatæ, āā fl. oz. 4. Mix.

275. *Solutions of Arnica.*

℞. Tincturæ Arnicæ, fl. drs. 1—6; Aquæ Destillatæ, ad fl. oz. 8. Mix. *As a lotion in sprains, contusions, and burns.*

℞. Tincturæ Arnicæ, fl. drs. 2; Tincturæ Belladonnæ, fl. oz. 1; Linimenti Saponis, ad fl. oz. 8. Mix, for an embrocation.

276. *Mercurial Liniments.*

℞. Linimenti Hydrargyri, fl. oz. 2; Linimenti Belladonnæ, Linimenti Opii, āā fl. oz. 1. Mix. *In syphilitic tubercles, nodes, &c.*

℞. Hydrargyri Perchloridi, gr. 6; Acidi Nitrici Diluti, min. 90; Aquæ Laurocerasi, fl. drs. 2; Glycerini, fl. oz. 1; Aquæ Destillatæ, fl. oz. 8. Mix. *To be used every night in cases of chloasma, syphilitic nodes and eruptions, &c.*

℞. Unguenti Hydrargyri, oz. 1; Glycerini, fl. oz. 1; Iodi, gr. 120; Olei Olivæ, fl. oz. 2. Mix. *To be gently rubbed over syphilitic nodes.*

277. *Rubefacient Liniment.*

℞. Pulveris Capsici, gr. 30; Olei Macis, min. 30; Linimenti Terebinthinæ, fl. oz. 3; Linimenti Camphoræ Compositi, ad fl. oz. 8. Mix. *As a liniment to the chest in some cases of bronchitis.*

278. *Stimulating Liniment.*

℞. Linimenti Saponis, Linimenti Opii, Linimenti Camphoræ Compositi, āā fl. oz. 1; Tincturæ Arnicæ, fl. drs. 2. Mix. *To be applied round the throat, on a strip of flannel, in subacute tonsillitis, common sore throat, &c.*

279. *Camphor Liniment and Opium, &c.*

℞. Linimenti Camphoræ Compositi, fl. oz. 2; Tincturæ Opii, Tincturæ Belladonnæ, āā fl. drs. 4. Mix. *To be rubbed over the scrobiculus cordis to check obstinate nausea and vomiting, pain, &c.*

280. *Iodide of Potassium Liniment.*

℞. Potassii Iodidi, *vel* Ammonii Iodidi, gr. 40; Aquæ, fl. drs. 4. Mix, and add —Glycerini, fl. oz. 1. *Useful in some glandular enlargements, as well as for dispersing the chalkstones of gout.*

281. *Belladonna and Aconite Liniment.*

℞. Linimenti Belladonæ, Linimenti Aconiti, āā fl. drs. 4; Linimenti Camphoræ Compositi, fl. oz. 3. Mix. The seat of pain to be rubbed with this liniment for ten minutes at bedtime. *In pleurodynia, chronic rheumatism, and painful nervous affections.*

For the same class of cases a good liniment may be made with one part of belladonna liniment, one of opium liniment, and four of turpentine liniment.

℞. Linimenti Belladonnæ, fl. drs. 3; Glycerini, fl. drs. 5; Linimenti Saponis, fl. oz. 2. Mix. The spine to be rubbed with this liniment night and morning for five minutes. *In hooping cough.* May be used for a child five years old.

282. *Chloroform, Belladonna, and Aconite Liniment.*

℞. Linimenti Chloroformi, Linimenti Aconiti, Linimenti Belladonnæ, Linimenti Opii, āā fl. drs. 4; Linimenti Saponis, fl. oz. 2. Mix. To be rubbed into the painful part night and morning. *In neuralgic and rheumatic pains of great severity.*

283. *Cod Liver Oil Embrocations.*

℞. Olei Morrhuæ, fl. drs. 14; Spiritûs Ammoniæ Aromatici, fl. oz. 1; Tincturæ Opii, fl. drs. 2; Olei Lavandulæ, min. 30. Mix. One-half to be well rubbed over the chest and abdomen, night and morning. *In phthisis and other cases where the use of cod liver oil is indicated, but where the stomach will not bear it.*

℞. Olei Morrhuæ, fl. oz. 1; Olei Cajuputi, fl. drm. 1. Mix. To be rubbed over the chest at bedtime. *The cajuput oil well disguises the smell of this embrocation.*

284. *Caoutchouc Solution.*

Take some thin pieces of india rubber, or of pure gutta percha, and dissolve them in chloroform. A good protective solution. *To be painted over superficial excoriations, threatened bed sores, &c.*

285. *Collodium Paints.*

℞. Collodii, fl. oz. 1; Olei Palmæ, min. 20; Anchusæ Radicis, sufficient to give colour.—A good artificial cuticle, which when spread on the skin will not crack, may also be formed by mixing two parts of glycerine with one hundred of collodion.—The officinal COLLODIUM FLEXILE consists of one fluid drachm of castor oil, one hundred and twenty grains of Canada balsam, and six fluid ounces of collodion.—*Either preparation may be used as a varnish in various cutaneous affections, excoriations, or superficial burns.*

℞. Collodii Flexilis, fl. drs. 4; Morphiæ Acetatis, gr. 5—20. Mix. *To be painted over the course of the affected nerve in neuralgia.*

286. *Glycerine and Lime Water, &c.*

℞. Glycerini, fl. oz. 1; Pulveris Tragacanthæ Compositi, gr. 120; Mellis Depurati, gr. 120; Liquoris Calcis Saccharati, fl. oz. 1½; Misturæ Amygdalæ, ad fl. oz. 8. Mix. *A good bland embrocation in cases of herpes, superficial burns, chapped hands, excoriations, &c.*

The officinal LINIMENTUM CALCIS, consisting of equal parts of olive oil and lime water, is also useful in some of the above-mentioned cases. For chapped hands the GLYCERINE OF STARCH is an excellent preparation.

℞. Linimenti Aconiti, fl. drs. 2; Linimenti Calcis, fl. drs. 10. Mix. *In vulval pruritus.*

℞. Acidi Carbolici, gr. 60—120; Linimenti Calcis, fl. oz. 8. Mix. *To prevent suppuration in burns, &c.*

287. *Ammonia and Cantharides, &c.*

℞. Spiritûs Ammoniæ Aromatici, Spiritûs Rosmarini, Glycerini, āā fl. oz. 1; Tincturæ Cantharidis, fl. drs. 3—6; Aquæ Rosæ, ad fl. oz. 8. Mix. *To be gently brushed into the scalp night and morning, when the hair is falling off after fever or any severe illness.*

A more elegant embrocation may be made by adding two fluid drachms of Tincture of Cantharides to two ounces of Eau de Cologne.

℞. Balsami Tolutani *vel* Peruviani, gr. 120; Olei Rosmarini, min. 20; Tincturæ Cantharidis, fl. drs. 4; Olei Ricini, fl. oz. 1; Adipis Præparati, oz. 1. Mix. *A valuable pomade in cases of baldness following ringworm, pityriasis, or tinea decalvans. It should be brushed into the scalp night and morning.*

288. *Sulphate of Atropia.*

℞. Atropiæ Sulphatis, gr. 1; Aquæ Destillatæ, fl. drs. 4. Mix. *Dilatation of the pupil is effected most speedily and is longest maintained by a solution of this kind. A full drop must be placed in the eye by means of a camel's-hair pencil: the effect will be produced in from fifteen to twenty minutes, and will sometimes continue for seven or eight days.*

The officinal LIQUOR ATROPIÆ SULPHATIS contains half a grain of the salt in each drachm. It is preferable to the Liquor Atropiæ for ophthalmic purposes; inasmuch as the spirit which is used in the latter to keep the alkaloid in solution causes considerable pain to the eyes when it is applied.

Discs of gelatine impregnated with atropine are prepared according to the instructions of MR. ERNEST HART and MR. STREATFEILD. These discs dissolve and act very efficiently when placed in contact with the moist conjunctiva. A piece, one-fifth of an inch square, contains as much of the Sulphate of Atropine as a drop of the solution of two grains to the ounce of water.

289. *Alum Coagulum.*

Take the whites of two eggs and shake them with fragments of alum to form a coagulum. *Useful when painted under the eyelid to produce contraction in trichiasis, entropion, &c.*

290. *Sedative Collyria.*

℞. Extracti Belladonnæ, gr. 2—4; *vel* Extracti Opii, gr. 2—5; *vel* Morphiæ Hydrochloratis, gr. 1—2; *vel* Acidi Hydrocyanici Diluti, min. 10; *vel* Tincturæ Aconiti, min. 5—30; Aqua Destillatæ, fl. oz. 1. Mix.

291. *Astringent Collyria.*

℞. Zinci Sulphatis, gr. 2—4; *vel* Aluminis Exsiccati, gr. 1—4; *vel* Tincturæ Arnicæ, min. 5—30; *vel* Cupri Sulphatis, gr. 1—4; *vel* Argenti Nitratis, gr. 1—4; *vel* Liquoris Plumbi Subacetatis, min. 10; *vel* Cadmii Sulphatis, gr. 1—3; Aquæ Destillatæ, fl. oz. 1. Mix.

℞. Zinci Oxidi, gr. 60; Aquæ Rosæ, fl. oz. 8. Mix. For an eye water, to be used night and morning.

292. *Iodide of Potassium Collyrium.*

℞. Potassii Iodidi, gr. 6—8; Aquæ Destillatæ, fl. oz. 1. Mix. *To remove stains of nitrate of silver from the conjunctiva.*

293. *Iodide of Lead Ointments.*

℞. Plumbi Iodidi, gr. 60; Unguenti Atropiæ, gr. 60—120 (each ounce contains eight grains of the alkaloid); Unguenti Simplicis, ad oz. 1. Mix. *In some malignant indurations.*

℞. Plumbi Iodidi, gr. 90; Unguenti Cetacei, oz. 1; Linimenti Belladonnæ, *vel* Linimenti Aconiti, fl. drm. 1. Mix. *For malignant and painful strumous ulcers.*

294. *Sulphate of Zinc Ointment.*

℞. Zinci Sulphatis Exsiccatæ, gr. 120; Unguenti Simplicis, oz. 1. Mix. *Very useful in some forms of lupus, rodent ulcer, &c. The officinal* ALUMEN EXSICCATUM *may be employed in the same cases.*

295. *Tar and Citrine Ointment.*

℞. Unguenti Picis Liquidæ, oz. 1½; Unguenti Cetacei, oz. 1; Unguenti Hydrargyri Nitratis, oz. ½. Mix. *In lepra, psoriasis, chronic eczema, &c.*

296. *Aconitine Ointments.*

℞. Unguenti Aconitæ, oz. ¼ (=to grs. 2 of the alkaloid); Unguenti Hydrargyri Subchloridi, oz. 1—2. Mix. *In some forms of neuralgia.*

℞. Unguenti Aconitæ, gr. 120. *In severe neuralgia. A small portion is to be painted over the nerve, but it must not be used where there is the slightest abrasion.*

297. *Belladonna and Opium.*

℞. Extracti Belladonnæ, Extracti Opii, āā gr. 60; Aquæ Laurocerasi, fl. drs. 4; Extracti Papaveris, oz. 3. Mix. *To be painted over the seat of inflammation in pleurisy, peritonitis, gout, gastric disease, &c. A fomentation flannel, or hot linseed poultice, or wet compress is to be applied; being separated from the extracts by a sheet of tissue paper.*

℞. Extracti Belladonnæ, gr. 120; Extracti Papaveris, oz. 2; Syrupi Papaveris, fl. oz. 1. Mix and label,—"To be painted over the seat of pain, which is then to be covered with water dressing or a bread and water poultice. Poison." *For inflammation of the absorbents, lymphatic glands, gallstone disease, peritonitis, &c.*

298. *Mercurial and Belladonna Ointments.*

℞. Unguenti Hydrargyri, gr. 10; Unguenti Atropiæ, gr. 30. *For relieving cases of severe nocturnal pain around the orbit. It is to be rubbed into the temple just before the pain may be expected.*

℞. Linimenti Belladonnæ, fl. drs. 2; Unguenti Hydrargyri Subchloridi, oz. 1. Mix. *In syphilitic tubercular diseases.*

299. *Corrosive Sublimate Ointment.*

℞. Hydrargyri Perchloridi, gr. 5; Unguenti Simplicis, oz. 1. Mix. *In parasitic diseases of the skin or scalp. Especially useful in ringworm. May be used as a pomatum, with a drop or two of otto of roses to perfume it, in scalp diseases where the presence of a parasitic fungus is feared.*

300. *Carbolic Acid Ointment.*

℞. Acidi Carbolici, gr. 25—40; Unguenti Zinci, oz. 3. Mix. *As a dressing for irritable sores or burns, or skin eruptions with offensive discharges.*

301. *Creasote and Red Oxide of Mercury.*

℞. Creasoti, min. 10; Unguenti Hydrargyri Oxidi Rubri, gr. 120; Unguenti Simplicis, gr. 360. Mix. *In parasitic diseases of the skin, the ulcerations of rupia, &c.*

302. *Red Iodide of Mercury Ointment.*

℞. Hydrargyri Iodidi Rubri, gr. 8; Unguenti Simplicis, oz. 1. Mix. *In chronic glandular tumours, a small portion rubbed in every night proves very useful. The officinal ointment is double the strength of the foregoing, and hence it causes pain and blistering.*

303. *Croton Oil and Lard.*

℞. Olei Crotonis, min. 15; Adipis Præparati, oz. ½. Mix. One-fourth part to be rubbed into the skin every eight hours, until an abundant pustular eruption is produced. *Useful as a counter irritant.*

304. *Veratria Ointment.*

℞. Unguenti Veratriæ, Unguenti Cadmii Iodidi, āā oz. 1. Mix. *In chronic rheumatism, chronic gout, &c.*

305. *Diluted Citrine Ointment.*

℞. Unguenti Hydrargyri Nitratis, gr. 40—120; Unguenti Cetacei, gr. 240. Mix. *As a stimulant and alterative in chronic skin diseases. May be applied to the edges of the eyelids in ophthalmia to prevent their adhering at night.*

306. *Compound Spermaceti Ointments.*

℞. Acidi Hydrocyanici Diluti, fl. drm. 1; Unguenti Atropiæ, gr. 120; Unguenti Cetacei, oz. 1. Mix. *In cutaneous diseases attended with pain and itching.*

℞. Balsami Peruviani, gr. 60; Unguenti Cetacei, oz. 1. Mix. *In slight excoriations.*

℞. Balsami Peruviani, gr. 60; Unguenti Cetacei, oz. 2; Alkannæ Tinctoriæ Radicis, gr. 60; Olei Rosæ (Otto of Roses), min. 10. Mix. *Useful as a lip salve and as an application to chapped hands and sore nipples.*

℞. Iodoformi, gr. 40; Unguenti Simplicis, oz. 1. Mix. *A soothing ointment for burns, scalds, irritable ulcers, chancres, boils, &c.*

307. *Belladonna and Iodide of Potassium.*

℞. Linimenti Belladonnæ, fl. drs. 2; Unguenti Potassii Iodidi, oz. 1. Make an ointment. The Liniment of Aconite may be substituted for the Belladonna, if desired. *In painful chronic tumours, neuralgia, &c.*

308. *Iodine and Cod Liver Oil Ointment.*

℞. Unguenti Iodi, Olei Morrhuæ, āā fl. drs. 4. Mix. *Useful when rubbed upon the throat in bronchocele; as well as when applied to strumous glands, unsuppurating buboes, and the tumid bellies of children with mesenteric disease.*

309. *Bole Armeniack and Lead.*

℞. Boli Armenæ Rubræ, Plumbi Oxidi Semivitrei, āā gr. 30; Camphoræ, gr. 5; Ceræ Flavæ, gr. 180; Adipis Præparati, gr. 360. Mix. To be spread on thick linen. *Several German physicians speak of this as an efficacious application for preventing and curing bed sores.*

310. *Compound Sulphur Ointments.*

℞. Unguenti Creasoti, Unguenti Sulphuris, āā oz. ½. Mix. *In pityriasis, and some other chronic cutaneous affections.*

℞. Sulphuris Iodidi, gr. 12; Unguenti Simplicis, oz. 1. Mix. *In acne, applied thrice daily.* The officinal iodide of sulphur ointment is one-third stronger.

℞. Sulphuris Iodidi, gr. 12; Sulphuris Præcipitati, gr. 20; Olei Amygdalæ Amaræ, min. 5; Adipis Præparati, oz. 1. Mix.

℞. Unguenti Hydrargyri Ammoniati, gr. 120; Unguenti Sulphuris, gr. 360. Mix. *A good antiparasitic ointment.*

311. *Bismuth and Morphia Ointment.*

℞. Bismuthi Subnitratis, oz. 1; Morphiæ Acetatis, gr. 6; Adipis Benzoati, oz. 3. Mix. *For irritable ulcers and eruptions, piles, &c.*

312. *Iodide of Cadmium Ointment.*

℞. Cadmii Iodidi, gr. 60; Adipis Præparati, oz. 1; Linimenti Aconiti, fl. drs. 2. Mix. *Superior to iodide of potassium ointment for rubbing into tender and enlarged strumous glands, nodes, &c.*

℞. Unguenti Cadmii Iodidi, oz. 2; Unguenti Atropiæ, oz. 1. Mix. *To be rubbed into painful strumous and glandular swellings.*

XIV. NARCOTICS AND SEDATIVES.

313. *Anæsthetics.*

The chief Anæsthetics which have hitherto been used in the practice of medicine are chloroform, ether, and nitrous oxide. As the employment of one or other of these agents is often indicated in calculous nephralgia, gallstone colic, some cases of cancer, neuralgia, maniacal delirium, convulsions, the paroxysmal dyspnœa of infantile largyngismus and diphtheria and croup, as well as in spasmodic diseases generally, a few words on their mode of administration may not be out of place.

The principal advantages of inhalation are these :—That by means of the immense surface offered by the air-cells of the lungs for absorption, a deeper and more rapid effect is induced than it would be safe or easy to effect by other means. At the same time, the digestive functions are less interfered with than when narcotics are given in the ordinary way.

In every form of inhalation (with the exception of the nitrous oxide, ether, and perhaps of the bichloride of methylene) the anæsthetic should be freely diluted with common air, and no attempt made to produce rapid narcotism; while the breathing ought to be allowed to go on quietly and naturally. The patient should be tranquil, fearless, and usually in the recumbent posture. If false teeth are worn, they are to be removed; since if there be any struggling, or sickness, or cough, the plate may become separated from the gums and be drawn into the pharynx, or may get to the back of the fauces and produce asphyxia by pressing on the glottis. And then the administrator of the narcotic agent, while watching the respiration and the countenance, had better also keep his finger on the pulse. For if the breathing becomes stertorous, or if it stop, or if it appear difficult and the pupils become widely dilated, or if there is evidence that the circulation is getting weak and faltering, the inhalation must be completely suspended ; while, if more serious symptoms follow, the body should be gently and gradually turned over to the left side, so as to allow of the region of the heart and the left side of the face resting upon the couch. According to Mr. Bader, this practice has been found very efficient at Guy's Hospital in removing dangerous symptoms.

Chloroform was introduced into practice by SIR JAMES Y. SIMPSON, of Edinburgh, in November, 1847. The vapour of this hot, sweet, heavy liquid may be inhaled by individuals of all ages, from infants under one year to persons as old as ninety; and in almost all states of the system. The exceptional cases which preclude its employment, at all events in medical practice, are instances of marked blood poisoning, of far advanced cardiac or pulmonary or cerebral disease, and perhaps of habitual drunkenness. It may be administered from an apparatus such as the late DR. SNOW recommended; but SIR JAMES SIMPSON always used a simple napkin folded into the shape of a funnel. A crumpled handkerchief in a tumbler forms a convenient inhaler; or a still more convenient inhaler is formed by a piece of lint made into a cone, upon the apex of which the chloroform can be dropped as required. MR. CLOVER employs a bag containing an admixture of air and chloroform vapour in definite proportion. But in whatever way it is exhibited care must be taken that it does not come into contact with the lips and nose; since it produces painful excoriations. Chloroform should also be given slowly and cautiously; and it acts best before breakfast, or when the patient's stomach is empty. If administered immediately after food, sickness is sure to result. According to DR. SNOW, about four cubic inches of vapour, or rather more than five grains of chloroform to each hundred cubic inches of air, is the proportion most suitable for causing insensibility to surgical operations ; but according to the Report of the Chloroform Committee of the Royal Medical and Chirurgical Society the proportion of vapour should not exceed three and a half per cent. As a general rule, however, in medical and obstetric cases it need only be used in a more diluted form.—When an overdose has been given, the patient should be made to inhale ether, as it counteracts the depressing action which chloroform exerts on the heart. Or artificial respiration, performed in the manner to be presently described, may be resorted to; the success of which will depend upon the extent to which the heart and the muscles of respiration have been paralysed by the chloroform. When death occurs, it arises from the failure of the functions of respiration and circulation. Respiration generally ceases and then the heart's action stops. DR. SNOW gave this anæsthetic in 4000 or more cases, with the loss of only one person while inhaling it; and amongst these were patients with heart disease, phthisis, and several who had suffered from apoplexy. It has been computed that during the Crimean war chloroform was administered 40,000 times, death resulting in only one case.

Æther (first used as an anæsthetic in September, 1846, by DR. W. T. G. MORTON, of Boston, Massachusetts,) is thought to be a safer agent for inducing narcotism than chloroform; but although it is so, still it must be given with caution. The disadvantages of ether are the longer time and large quantity of the agent required, the struggling excited, and the disagreeable irritation of the throat produced. About one fluid ounce is usually inhaled by an adult in becoming insensible; though not more than half this quantity is absorbed, the remainder being thrown back from the lungs. Some of the disadvantages may be avoided by first inducing insensibility by nitrous oxide and then giving ether to keep it up. An excellent anæsthetic for obstetric practice may be made with equal parts of ether and chloroform.

Amylene is made by distilling amylic alcohol (obtained from crude fusel oil, or oil of potato spirit) with chloride of zinc. In the present state of our knowledge, it is not advisable to resort to this agent. DR. SNOW seems to have administered it in 238 cases, and to have had two deaths from it.

In October, 1867, DR. RICHARDSON recommended the use of the *Bichloride of Methylene* as a general anæsthetic. He did so on these grounds amongst others:—(1) The sleep produced by it is as deep as that by chloroform, but more natural and agreeable. (2) The second degree of narcotism is shorter than with other anæsthetics. (3) When the effects are fully developed, the narcotism is very prolonged and is easily reproduced. (4) The final escape of the bichloride from the organism is rapid: hence the recovery from its influence is sudden. It rarely produces headache, sickness, or any sense of exhaustion. (5) When it destroys life, it does so by equally paralysing the organs of respiration and circulation. (6) It combines with ether and with chloroform in all proportions. And indeed, in its properties generally, it seems to resemble a compound of these two agents.

DR. RICHARDSON has also shown that by saturating *Ether with Chloride of Methyl* an anæsthetic is formed. The product has, however, the disadvantage of not being a very stable compound; and hence he does not at present recommend its employment.

The *Tetrachloride of Carbon* has been employed for producing anæsthesia during surgical operations, for abolishing the pains of parturition, for the relief of neuralgia and hay fever and toothache, for the induction of sleep, as well as for subduing excessive palpitation of the heart. Dr. SANSOM says that amylene and the tetrachloride of carbon have an analogous action. He does not recommend the latter where such anæsthesia as is necessary for a surgical operation is required; but thinks a mixture of six parts of chloroform and one of tetrachloride may prove valuable. The latter, in its pure state, can be used where it is only necessary to relieve pain without destroying consciousness: to this extent its action is that of a stimulant, anodyne, and hypnotic.

The inhalation of *Nitrous Oxide* to prevent the pain of surgical operations was suggested by SIR HUMPHRY DAVY in 1799, when he ascertained that its respiration produced effects analogous to those caused by drinking fermented liquors—usually a transient intoxication, or violent exhilaration. These effects were shown in popular lectures at the Adelaide Gallery, in London, somewhere about 1840. In 1844, DR. COLTON administered it to an American dentist—HORACE WELLS, and painlessly extracted one of his teeth. The introduction of ether inhalation by DR. MORTON, in 1846, withdrew professional attention from the nitrous oxide. The latter has, however, again been introduced into practice, and is now (1874) being largely employed by dentists. DR. COLTON is said to have given it in twenty-eight thousand cases without an accident. The great advantages of this gas over other anæsthetics seem to be its safety; the fact that it induces insensibility in from 60 to 180 seconds; that the complete insensibility lasts for about half a minute; while in about a couple of minutes afterwards there is restoration to consciousness without any sickness or faintness. Nitrous oxide is inhaled undiluted with atmospheric air: when used mixed with air it causes a prolonged stage of exhilaration—whence it was known as "laughing gas."

An excellent anæsthetic, which has been very largely used by the Author, can be made by mixing equal parts of pure *Chloroform and Ether*. No special apparatus is required for its employment: though the flannel mask recommended by DR. SKINNER, with the drop bottle, will be found convenient. The only precaution necessary is that there should be no impediment to the free admission of air.—The Chloroform Committee of the Royal Medical and Chirurgical Society has recommended a mixture composed by measure of three parts of ether, two of chloroform, and one of alcohol. That this is safer than pure chloroform cannot be doubted; but it has seemed to the Author less useful than this agent with an equal quantity of ether.

In apparent death from any anæsthetic, *artificial respiration*, after the plan recommended by DR. SILVESTER, ought to be tried. The body is to be laid on its back with the head and shoulders slightly raised. The mouth and nostrils are to be cleansed from mucus; and the tongue should be drawn firmly forwards so as to keep the tip well protruded at the side of the mouth. Then the operator is to compress, for two or three seconds, the front and sides of the chest by the patient's own arms. Thus the medicated vapour will be partly expelled from the lungs; while upon the pressure being suddenly removed, the elastic walls of the chest will expand, and give the primary impetus to respiration. To assist expansion to the utmost the ribs should be drawn upwards by means of the pectoral muscles. This is effected by the operator grasping the arms just above the elbows, and drawing them upwards until they nearly meet above the head. Then they must be lowered, and replaced at the sides; at the same time making moderate pressure with them, for a couple of seconds, against the chest walls. This process is to be repeated fifteen times in the minute. At the same time the face ought to be well fanned. No attempt should be made to administer stimulants by the mouth.

In some instances, galvanism of the phrenic nerve, diaphragm, and intercostal muscles would be useful in keeping up the movements of respiration; one pole of the battery being applied over the outer edge of the sterno-mastoid muscle just above the clavicle, while the other is pressed deeply into the seventh intercostal space. The diaphragm must be made to contract and relax alternately, by interrupting the currents at different intervals.

While attempts are thus being made to oxygenate the blood, an assistant is to rub the limbs from the extremities towards the heart. If no respiratory efforts supervene, the face and chest are to be dashed with cold water, or with hot and cold water alternately. When success follows this plan, the temperature of the body must be maintained by friction, hot blankets, the warm bath, &c.

314. *Morphia, Atropine, Aconitine, &c., for Subcutaneous Injection.*

The solution of *Acetate of Morphia* as used for injection under the skin can be well made by mixing ten grains of this salt with one fluid drachm of distilled water. It is unnecessary to rub up the salt with hot distilled water and acetic acid, subsequently neutralizing the latter with liquor potassæ. The solubility of the acetate of morphia in water is 1 in 6; of the hydrochlorate, 1 in 20.

Each six minims of a solution thus made will contain one grain of acetate of morphia. For first injections not more than one minim and a half should be used; as it is certain that this narcotic acts more powerfully when thus employed, than when taken into the stomach. In diseases which are continuously painful the ease given by an injection will last for about twelve hours. To relieve the suffering of advanced cancer, &c., the injection may be advantageously given, night and morning, for many months.

A solution of *Bimeconate of Morphia* for hypodermic injections is prepared by MR. PETER SQUIRE. Each minim of this concentrated solution is equivalent to min. 16 of the officinal tincture of opium, or to one-sixth of a grain of acetate of morphia.

The subcutaneous injection of morphia often causes troublesome nausea and retching, which may continue for 18 or 20 hours. This unpleasant result can be obviated, according to DR. JOHN HARLEY, by administering a small quantity of atropine ($\frac{1}{75}$ of a grain) with the morphia.

The subcutaneous injection of *Atropine* is sometimes useful in cases of intestinal obstruction, asthma, tetanus, neuralgia, chorea in the adult, &c. Great caution is necessary: not more than two minims of the officinal Liquor Atropiæ

(=to gr. $\frac{1}{60}$), or of the Liquor Atropiæ Sulphatis, should be employed at first. During a severe paroxysm of asthma, the use of two minims of the liquor atropiæ mixed with the same quantity of the morphia solution will often produce satisfactory results. The good effect is increased in some cases by having recourse to this injection while the patient is unconscious from the inhalation of a mixture of ether and chloroform.

Chloroform may be used in the same manner. The injection of ten or fifteen minims often effects a cure for the time in pleurodynia, neuralgia, sciatica, &c. It has the disadvantage of sometimes producing an irritable ulcer, which may be slow in healing.

A solution of *Aconitine* may be made thus: Aconitiæ, gr. 1; Spiritûs Rectificati, min. 10; Aquæ Destillatæ, ad fl. drs. 2. Mix. For first injections not more than two minims should be employed: the dose may afterwards be safely increased to four minims (gr. 1–30). It is better, though not absolutely necessary, to make the injection at the seat of pain. The local tingling which follows is often severe; but this is of no consequence compared to the neuralgic pain for which it is used.

315. *Morphia Draughts, &c.*

℞. Liquoris Morphiæ Hydrochloratis, min. 30 (=to gr. $\frac{1}{4}$ of the salt); Syrupi Limonis, fl. drm. 1; Tincturæ Hyoscyami, fl. drm. 1; Aquæ Camphoræ, fl. oz. 1. Mix. To be taken at bedtime. *In insomnia with pain.*

℞. Liquoris Morphiæ Hydrochloratis, min. 15—30; Spiritûs Chloroformii, fl. drm. 1 (=to min. 3 of chloroform); Spiritûs Ætheris, min. 30; Tincturæ Belladonnæ, min. 20; Tincturæ Cardamomi Compositæ, fl. drm. 1; Aquæ, ad fl. oz. $1\frac{1}{2}$. Mix. To be taken every two hours (the patient being watched) until the pain ceases. *Useful in facilitating the passage of gallstones.*

℞. Liquoris Morphiæ Hydrochloratis, min. 40; Acidi Hydrocyanici Diluti, min. 20; Syrupi Scillæ, fl. drs. 6; Tincturæ Benzoini Compositæ, fl. oz. 1; Mucilaginis Acaciæ, ad fl. oz. 6. Mix. One tablespoonful every three or four hours. *In many irritable coughs.*

316. *Chloral Draught.*

Hydrate of Chloral it an excellent hypnotic, and is supposed by Liebreich to be decomposed by the alkaline blood yielding chloroform as the active agent. It has a nauseous taste, and sometimes causes vomiting, and on this account is usually disguised for administration. The dose is from 20—60 grains, and it should be given when the patient is settled in a position for sleep.

Croton Chloral, also introduced by Liebreich, is supposed to have special influence on pain in the region of the fifth nerve.

℞. Chloral Hydrate, gr. 20—60; Syrupi Tolutani vel Aurantii, fl. dr. 1; Aquæ Menthæ Piperitis, ad fl. oz. 1 or $1\frac{1}{2}$. Mix for a night draught.

317. *Chloroform and Opium, or with Morphia and Indian Hemp.*

℞. Chloroformi, min. 6—10; Extracti Opii Liquidi, min. 15—30; Tincturæ Belladonnæ, min. 10—20; Syrupi Rhœados, fl. drm. 1; Mucilaginis Tragacanthæ, fl. oz. 1. Mix, for a night draught. *In severe colic and other spasmodic disorders.*

℞. Liquoris Morphiæ Hydrochloratis, min. 20; Tincturæ Chloroformi Compositæ, min. 30; Tincturæ Cannabis Indicæ, min. 20; Pulveris Tragacanthæ Compositi, gr. 80; Spiritûs Ætheris, min. 40; Acidi Hydrocyanici Diluti, min. 4; Tincturæ Hyoscyami, fl. drm. 1; Aquæ, ad fl. drs. 12. Mix, for a night draught. *In many chronic diseases attended with pain or restlessness.*

The medicine called CHLORODYNE probably consists essentially of chloroform, Indian hemp, morphia, and hydrocyanic acid. In the *Canada Lancet* (15 October, 1864) DR. W. E. BOWMAN gives the following formula for its preparation:—Take of Chloroform, half a fluid ounce; Sulphuric Ether, ninety minims; Oil of Peppermint, eight drops; Resin of Indian Hemp, six grains; Capsicum, two grains. Mix, shake occasionally, and allow it to stand for a few days. Take of Muriate of Morphia sixteen grains, dissolved by the aid of heat in two fluid drachms of water; to which when cold, add of Scheele's Hydrocyanic Acid, sixty-five minims; Perchloric Acid, one fluid drachm; Treacle, two fluid ounces. Add this gradually to the first mixture, and then make the whole measure four fluid ounces by the addition of treacle or water.—Each dose of thirty minims contains of chloroform min. 4, ether min. $1\frac{1}{2}$, extract of hemp, gr. $\frac{1}{10}$, hydrochlorate of morphia, gr. $\frac{1}{4}$, and of Scheele's acid, min. 1.

MR. SQUIRE gives for Chlorodyne a formula which contains no Indian Hemp or Capsicum, and a smaller dose of Morphia. MR. ED. SMITH assigns to it the following composition:—

℞. Chloroformi, fl. dr. 4; Morphiæ mur., gr. 20: Æther. rectf. fl. dr. 2; Ol. Menthæ Pip., min. 8; Acidi Hydrocyanici dil. fl. dr. 4; Tinct. Capsici, fl. dr. 6; Mist. Acaciæ, fl. oz. 1; Theriacæ, ad fl. oz. 5.

318. *Brandy and Egg Mixture, with Opium.*

℞. Misturæ Spiritûs Vini Gallici (See F. 17) fl. oz. 1; Extracti Opii Liquidi, min. 5—10; Spiritûs Chloroformi, min. 30. Mix. To be taken every four hours. *In exhaustion from pain.*

319. *Tolu and Camphorated Opium.*

℞. Tincturæ Tolutanæ, fl. drs. 2; Syrupi Tolutani, fl. oz. 1; Tincturæ Camphoræ Compositæ, fl. drs. 4 (= to gr. 1 of opium); Mucilaginis Tragacanthæ, ad fl. oz. 8. Mix. Two tablespoonfuls three times a day. *For old people, where the mucous secretion from the bronchi is excessive.*

320. *Cimicifuga Racemosa, or Black Snakeroot.*

℞. Tincturæ Acteæ Racemosæ, min. 30—fl. drs. 2; Aquæ, ad fl. oz. 1. Mix, for a draught. To be administered every three or four hours until nausea ensues or the pulse becomes lowered. *This drug possesses narcotic and eliminative properties: and is useful in chronic rheumatism, lumbago, chorea, obscure nervous pains, and in backache from uterine disturbance.*

321. *American Hellebore.*

℞. Tincturæ Veratri Viridis (a saturated solution) min. 5—10; Aquæ, fl. oz. 1. Mix. This draught may be given every three hours, adding one drop of tincture to each dose, until the pulse becomes sufficiently lowered or nausea is produced. The latter is readily counteracted by small doses of morphia. *It is a valuable arterial sedative: and is particularly used by American physicians in inflammations of the lungs, pleura, or peritoneum, and in acute rheumatism.*

322. *Lobelia and Ether.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. 2; Tincturæ Lobeliæ Ætheræ, fl. drs 3—6; Tincturæ Aconiti, min. 30; Aquæ Camphoræ, ad fl. oz. 8. Mix. One-sixth part twice or thrice daily. *As a sedative in some cases of asthma.*

323. *Stramonium and Henbane.*

℞. Extracti Stramonii, gr. 3; Extracti Hyoscyami, gr. 20; Extracti Lupuli, gr. 40. Mix, and divide into twelve pills. One to be taken every four hours until relief is obtained. *In chronic disorders attended with suffering, in diseases of the nervous system accompanied with pain and restlessness, and in the dyspnœa of phthisis and emphysema.*

℞. Tincturæ Stramonii, fl. drs. 1—2; Tincturæ Hyoscyami, fl. drs. 3—6; Tincturæ Cantharidis, fl. drm. 1; Spiritûs Chloroformi, fl. drs. 3; Aquæ, ad fl. oz. 8. Mix. One-sixth part three times a day. *In some cases of asthma*

324. *Opium and Ipecacuanha.*

℞. Extracti Opii, Pulveris Ipecacuanhæ, āā gr. 1; Potassæ Nitratis, gr. 8; Glycerini, sufficient to make a mass. Divide into two pills, and order them to be taken at bedtime. *A good narcotic and diaphoretic. It is preferable to the officinal* Compound Powder of Ipecacuanha, *as the nitrate of potash acts better than the sulphate.*

℞. Vini Ipecacuanhæ, fl. drs. $2\frac{1}{2}$; Extracti Opii Liquidi, min. 30; Syrupi Tolutani, fl. drs. 5; Mucilaginis Tragacanthæ, fl. oz. 1. Mix. One teaspoonful every two or three hours. *In chronic cough.*

325. *Henbane, Camphor, and Hop.*

℞. Extracti Hyoscyami, gr. 40—60; Camphoræ Lupulinæ, āā gr. 20. Mix, divide into 18 pills, and order three to be taken every night at bedtime. *An excellent sedative for hysterical and hypochondriacal patients suffering from sleeplessness. Useful also in some forms of insanity.*

℞. Spiritûs Camphoræ, min. 30; Tincturæ Hyoscyami, Tincturæ Lupuli, āā fl. drm. 1; Mucilaginis Acaciæ, fl. oz. 1. Mix, for a draught to be taken at bedtime.

326. *Belladonna. Atropia.*

℞. Extracti Belladonnæ, gr. 5; Zinci Sulphatis, gr. 30; Extracti Gentianæ, gr. 90. Make a mass, divide into twenty pills, and order one to be taken three times a day. *In cases where a sedative and tonic action is to be produced. Especially useful in some diseases attended with irritability of the urinary organs. Also in many spasmodic coughs.* See F. 92.

℞. Extracti Belladonnæ, gr. $\frac{1}{4}$; Extracti Quassiæ, gr. 2. Mix into a pill, to be taken night and morning. *In epilepsy. Requires to be given for a long period.*

℞. Tincturæ Belladonnæ, min. 10—15; Spiritûs Ammoniæ Aromaticæ, min. 20; Aquæ, fl. oz. 1. Mix. To be taken three or four times a day. *In heart disease, with irritability and palpitation.*

℞. Camphoræ, gr. 5; Extracti Belladonnæ, gr. $\frac{1}{3}$; Extracti Conii, gr. 4; Spiritûs Rectificati, sufficient to make two pills. To be taken every night at bedtime. *In spermatorrhœa; convulsions; as well as in certain spasmodic affections of the air passages.*

℞. Liquoris Atropiæ, fl. drs. 2. One drop (=gr. 1-120) in a tablespoonful of brandy and water, night and morning. *In epilepsy.* The dose to be increased by one drop every second or third week. A preparation of zinc may be given at the same time, if desired.

327. *Camphor, Opium, and Blue Pill.*

℞. Camphoræ, gr. 5; Extracti Opii, gr. 1; Pilulæ Hydrargyri, gr. 4. Mix, divide into two pills, and order them to be taken at bedtime. *In restlessness with congestion of the liver and irritability of the sexual organs. Also in venereal sores with nocturnal emissions.*

328. *Codeia and Assafœtida.*

℞. Codeiæ, gr. $\frac{1}{2}$; Pilulæ Assafœtidæ Compositæ, gr. 5. Mix into a pill, to be taken every night at bedtime. *Especially useful in attacks of spasmodic cough, dyspnœa, &c.*

329. *Morphia and Assafœtida.*

℞. Morphiæ Hydrochloratis, gr. 2; Assafœtidæ, gr. 30; Camphoræ, gr. 20. Make a mass, divide into twelve pills, and order one to be taken at bedtime. *A good stimulant and antispasmodic.*

330. *Aconite with Guaiacum, Mercury, or Opium.*

R. Tincturæ Aconiti, min. 20—40; Spiritûs Ætheris, fl. drs. 4; Misturæ Guaici, ad fl. oz. 8. Mix. One-sixth part every six hours. *As an anodyne, stimulant, and alterative in chronic rheumatism, neuralgia, &c.*

R. Extracti Aconiti, gr. 1—3; Pilulæ Hydrargyri Subchloridi Compositæ, gr. 3. Make into a pill, and order it to be taken every night at bedtime. *In sleeplessness from a syphilitic taint.*

R. Extracti Aconiti, Extracti Opii, āā gr. 8; Extracti Hyoscyami, gr. 16. Mix, and divide into eight pills. One to be taken every four, six, or eight hours. *In some acute inflammations,—as peritonitis, pleurisy, ovaritis, &c.*

331. *Opium and Sugar of Milk.*

R. Pulveris Ipecacuanhæ Compositi, gr. 1; Sacchari Lactis, gr. 120. Mix, and divide into four powders. One to be taken every night, beaten up in a teaspoonful of cream. *A safe opiate for infants from two to six weeks old.*

R. Tincturæ Opii, min. 1; Sacchari Lactis, oz. ½; Mucilaginis Tragacanthæ, Aquæ Anethi, āā fl. drs. 4. Mix. One teaspoonful twice or thrice in the twenty-four hours. *To relieve the painful diseases of early life.*

332. *Tincture of Henbane.*

R. Tincturæ Hyoscyami, fl. oz. 1. One teaspoonful in a wineglassful of water every night at bedtime. The dose may be gradually increased until from one to three fluid ounces can be taken every night. *In some forms of epilepsy.*

333. *American Wild Cherry.*

R. Tincturæ Pruni Virginianæ, fl. drs. 3—6; Aquæ, ad fl. oz. 8. Mix. One eighth part every four or six or eight hours. The dose of the Infusion is one ounce, at the same intervals. *As a sedative and tonic in cases of cardiac weakness with inefficient action; in valvular disease with dilatation; mitral regurgitation; chronic bronchitis with valvular disease or dilated ventricles; atonic dyspepsia; intestinal irritability, &c.* The action is less powerful than that of digitalis; but it is often better borne, and can be continued for a longer time. After a course of the American Wild Cherry, quinine and steel will often prove useful, though previously they may have been injurious.

334. *Preparations of Digitalis.*

R. Infusi Digitalis, fl. drs. 12; Aquæ Anethi, ad fl. oz. 8. Mix. One sixth part every two, three or four hours. *Recent experiments tend to prove that digitalis is a cardiac stimulant and tonic for a time. In feeble and irregular action of the heart this drug proves of great value; as it also does in dilatation and hypertrophy of the left side of the heart. Digitalis is very serviceable in cardiac dropsy, when there is a feeble and frequent and irregular pulse, with a scanty secretion of high-coloured urine; inasmuch as it gives increased force to the heart's contractions, while it has a diuretic action on the kidneys. Digitalis had better be avoided in examples of fatty degeneration of the heart. In some cases of delirium tremens large doses have a very good effect.*

R. Tincturæ Digitalis, fl. drs. 1—2; Tincturæ Cardamomi Compositæ. fl. drs. 6; Acidi Hydrocyanici Diluti, min. 20; Aquæ Camphoræ, ad fl. oz. 8. Mix. One sixth part three times a day. *In some forms of cardiac disease with irritability of the stomach.*

℞. Acidi Sulphurici Aromatici, fl. drs. 2; Tincturæ Digitalis, fl. drm. 1; Extracti Opii Liquidi, min. 30; Infusi Chiratæ, ad fl. oz. 8. Mix. One sixth part three times a day.

335. *Hemlock and Henbane, &c.*

℞. Extracti Conii, Extracti Hyoscyami, Pilulæ Rhei Compositæ, āā gr. 3. Mix, and divide into two pills. To be taken at bedtime. *To relieve sleeplessness with constipation. In some forms of asthma.*

℞. Extracti Conii, Extracti Hyoscyami, Pilulæ Hydrargyri, āā gr. 3; Pulveris Ipecacuanhæ, gr. 1. Mix, and divide into two pills. To be taken at bedtime.

336. *Hemlock and Dover's Powder.*

℞. Extracti Conii, gr. 36; Pulveris Ipecacuanhæ Compositi, gr. 24. Mix, and divide into twelve pills. One to be taken every three or four hours. *To relieve the pain arising from malignant disease.*

337. *Henbane and Indian Hemp, &c.*

℞. Extracti Cannabis Indicæ, gr. $\frac{1}{4}$—1; Extracti Belladonnæ, gr. $\frac{1}{4}$; Extracti Hyoscyami, gr. 4. Make into a pill. To be taken every twelve or twenty-four hours. The efficacy of this pill can sometimes be increased by giving with it a draught containing some spirit of chloroform or spirit of ether.

338. *Iodoform Pills and Suppositories.*

℞. Iodoformi, gr. 2—6; Extracti Conii, gr. 4. Mix. Divide into two pills, and order them to be taken at bedtime. *In painful diseases of the stomach. The Author has once or twice found a full dose of iodoform relieve a paroxysm of asthma.*

℞. Iodoformi gr. 3—8; Olei Theobromæ, gr. 20. Mix, for a suppository. *As a local anæsthetic in cancerous and other painful diseases of rectum.* The anodyne action of Iodoform is uncertain.

339. *Narcotic Enemata.*

℞. Liquoris Morphiæ Acetatis, min. 20—60; Tincturæ Catechu, min. 40; Vini Ipecacuanhæ, min. 30; Mucilaginis Amyli, fl. oz. 2. Mix. The bowel should be washed out with warm water before the administration of this enema. *In diarrhœa, tenesmus, strangury, &c.*

℞. Extracti Opii Liquidi, min. 20—fl. drm. 1; Tincturæ Belladonnæ, min. 15—30; Mucilaginis Amyli, fl. oz. 2. Mix. *In cancer of uterus, rectum, &c.*

340. *Opiate Suppositories.*

℞. Pulveris Opii, gr. 1—2; Saponis Duri, gr. 10. Mix, for a suppository. *To allay pain or irritation about the pelvic viscera.*

℞. Extracti Opii, gr. 1—3; Extracti Belladonnæ, gr. $\frac{1}{2}$; Olei Theobromæ, gr. 20. Mix into a suppository. *Especially useful in diseases of the bladder, uterus, and rectum.*

341. *Lettuce Opium.*

℞. Lactucarii, gr. 8—10. To be divided into two pills, to be taken at bedtime. *A doubtful narcotic. Has been chiefly used as an anodyne in phthisis, or where opium cannot be borne.*

342. *Indian Hemp, Aconite, and Ether.*

℞. Tincturæ Cannabis Indicæ, min. 20; Spiritûs Juniperi, min. 30; Spiritûs Ætheris, min. 45; Tincturæ Aconiti, min. 10; Mucilaginis Acaciæ, ad fl. drs. 12. Mix, for a draught. To be taken at bedtime. *In neuralgic dysmenorrhœa, &c.*

343. *Opium, or Morphia, and Henbane.*

℞. Extracti Opii, gr. 1—4, *vel* Morphiæ Hydrochloratis, gr. $\frac{1}{4}$—1; Extracti Hyoscyami, gr. 5. Make into two pills, to be taken at bedtime. *For the relief of severe pain, and to afford sleep in lingering diseases.*

344. *Opium and Belladonna.*

℞. Extracti Opii, gr. 1; Extracti Belladonnæ, gr. $\frac{1}{4}$; Extracti Conii, gr. 3. Make into a pill, to be taken every three or four hours. *In intestinal obstruction. And in other cases where it is necessary to relieve severe pain without inducing constipation. The belladonna also increases considerably the hypnotic action of the opium.*

345. *Opium and Capsicum.*

℞. Extracti Opii, gr. 1—2; Capsici Fructûs, gr. 2; Extracti Hyoscyami, gr. 4. Make into two pills, to be taken every night at bedtime. *In those diseases where opium is needed, but where it is not well borne, owing to its producing headache, sickness, &c. The stimulating effect of the capsicum will often ward off these unpleasant results.*

346. *Morphia and Squill Linctus.*

℞. Syrupi Scillæ, Syrupi Rhœados, āā fl. drs. 10; Aquæ Laurocerasi, min. 25; Tincturæ Benzoini Compositæ, fl. drs. 3; Liquoris Morphiæ Hydrochloratis, fl. drm. 1. Mix, and label,—"A small teaspoonful to be taken frequently, if the cough is troublesome."

347. *Compound Linctus.*

℞. Spiritûs Chloroformi, fl. drs. 3; Vini Ipecacuanhæ, fl. drs. 2; Liquoris Morphiæ Acetatis, fl. drm. 1; Acidi Hydrocyanici Diluti, min. 15; Tincturæ Conii, fl. drs. 2; Syrupi Tolutani, ad fl. oz. 3. Mix, and label,—"One teaspoonful every two or three hours, until the cough is relieved." See F. 246, 247.

XV. REFRIGERANTS AND SALINES.

348. *Saline Draughts.*

℞. Sodæ Bicarbonatis, gr. 20; Aquæ Laurocerasi, min. 10; Syrupi Limonis, fl. drm. 1; Aquæ, ad fl. oz. 2. Mix. An effervescing draught is to be made by the addition of a tablespoonful of lemon juice, or of eighteen grains of citric acid. To be taken every four or six hours. *In fever with nausea.*

℞. Spiritûs Ætheris Nitrosi, fl. drs. 4; Liquoris Ammoniæ Acetatis, fl. drs. 12—18; Vini Colchici, fl. drm. 1; Aquæ Camphoræ, ad fl. oz. 8. Mix. Two tablespoonfuls every four hours.

℞. Potassæ Nitratis, gr. 40, *vel* Potassæ Citratis, gr. 100; Vini Antimoniale, fl. drm. 1; Liquoris Ammoniæ Acetatis, fl. drs. 14; Aquæ Camphoræ, ad fl. oz. 8. Mix. One sixth part every four hours.

349. *Saline with Excess of Ammonia.*

℞. Liquoris Ammoniæ Acetatis, fl. drs. 10; Spiritûs Ammoniæ Aromatici, fl. drs. 3; Syrupi Limonis, fl. drs. 6; Tincturæ Aconiti, min. 30; Aquæ, ad fl. oz. 8. Mix. One sixth part every four hours. *In the early stages of fever, tonsillitis, acute pneumonia, &c.*

350. *Dr. Stevens' Saline Mixture.*

℞. Sodii Chloridi, gr. 20; Potassæ Chloratis, gr. 7; Sodæ Carbonatis, gr. 30. Aquæ, fl. drs. 12. Mix. To be taken every half hour. *In malignant cholera.*

351. *Colchicum and Magnesia.*

℞. Vini Colchici, fl. drs. 1½; Magnesiæ Carbonatis, gr. 120; Spiritûs Ammoniæ Aromatici, fl. drs. 3; Tincturæ Hyoscyami, fl. drs. 4–6; Aquæ Camphoræ, ad fl. oz. 8. Mix. One sixth part night and morning. *In slight cases of gout, &c.*

352. *Colchicum and Chlorate of Potash.*

℞. Vini Colchici, fl. drs. 2; Potassæ Chloratis, gr. 120; Liquoris Ammoniæ Citratis, fl. drs. 20; Aquæ Camphoræ, ad fl. oz. 8. Mix. One sixth part three times a day. *In gout with heat and dryness of the skin.*

353. *Borax and Nitric Ether.*

℞. Boracis, gr. 80; Spiritûs Ætheris Nitrosi, fl. drs. 3; Syrupi Papaveris, fl. drs. 6; Infusi Lini, ad fl. oz. 8. Mix. One sixth part every six hours.

354. *Ammonia, Chlorinated Soda, and Serpentary.*

℞. Ammoniæ Carbonatis, gr. 30; Liquoris Sodæ Chloratæ, fl. drm. 1; Infusi Serpentariæ, fl. oz. 8. Mix. One sixth part every six hours. *As a diaphoretic and stimulant in the low stage of continued fever.* See F. 368.

355. *Bicarbonate of Potash Drink.*

℞. Potassæ Bicarbonatis, oz. ¼—½; Syrupi Limonis, fl. oz. 1; Aquæ, ad O. 2. Mix, for the day's drink. *Very useful in the uric acid diathesis, in acute rheumatism, &c. A drink called "Constitution water" owes its efficacy to the bicarbonate of potash it contains.*

356. *Cream of Tartar Drink.*

℞. Potassæ Tartratis Acidæ, oz. 1; Olei Limonis, min. 15; Sacchari Albi, oz. 2; Aquæ Bullientis, O. 2. Mix. To be used when cold, as a common drink. *In simple fever, with constipation and great thirst.*

357. *Hydrochloric Acid Drinks.*

℞. Acidi Hydrochlorici Diluti, fl. drs. 2—3; Mellis Depurati, oz. 1; Decocti Hordei, O. 2. Mix, for the daily drink. *In typhus, &c.*

℞. Acidi Hydrochlorici Diluti, fl. drs. 2; Potassæ Chloratis, gr. 180; Syrupi Zingiberis, fl. oz. 1; Decocti Hordei, O. 2. Mix. *A valuable drink in some cases of fever.*

358. *Saline Lemonade.*

℞. Sodii Chloridi, gr. 200 ; Potassæ Chloratis, gr. 240 ; Sodæ Tartaratæ, gr. 100 ; Sodæ Phosphatis, gr. 50 ; Succi Limonis recentis, fl. oz. 6 ; Syrupi Limonis, fl. oz. 14 ; Aquæ, O. 7. Mix. *To be taken ad libitum, iced or not as is most agreeable, in cholera and choleraic diarrhœa.*

359. *Phosphoric Acid Drink.*

℞. Acidi Phosphorici Diluti, fl. drs. 3 ; Glycerini, fl. oz. 1 ; Decocti Hordei, O. 2. Mix. *An efficacious drink for assuaging thirst in some diseases attended with nervous exhaustion. It was recommended by* Dr. Paris *and* Sir Thomas Watson *as useful in diabetes; but according to* Griesinger *it positively increases the quantity of sugar excreted.*

360. *Chlorate of Potash Drinks.*

℞. Potassæ Chloratis, gr. 60 ; Syrupi Hemidesmi, fl. oz. 1 ; Aquæ, O. 1. Mix. *In the eruptive fevers, some inflammations, &c.*

℞. Potassæ Chloratis, oz. 1 ; Potassæ Bicarbonatis, oz. 2—4. Mix, and divide into eight powders. One to be dissolved in a pint of barley water for the day's drink. *In acute rheumatism.*

XVI. STIMULANTS.

361. *Ammonia and Bitters.*

℞. Ammoniæ Carbonatis, gr. 30 ; Spiritûs Myristicæ, fl. drs. 2 ; Tincturæ Chloroformi Compositæ, fl. drm. 1 ; Tincturæ Cardamomi Compositæ, fl. drs. 6 ; Infusi Caryophylli, ad fl. oz. 8. Mix. One sixth part every four or six hours. *In debility with nausea and flatulence. Also in erysipelas, tonsillitis, scarlet fever, &c.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. 3 ; Tincturæ Lupuli, fl. drs. 6 ; Spiritûs Ætheris, fl. drs. 3 ; Tincturæ Gentianæ Compositæ, fl. oz. 1 ; Infusi Sennæ, ad fl. oz. 8. Mix. One sixth part twice or thrice daily. *In phosphuria with constipation.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. 3 ; Aquæ Laurocerasi, fl. drm. 1 ; Sodæ Bicarbonatis, gr. 60 ; Tincturæ Calumbæ, fl. drs. 6 ; Aquæ Anethi, ad fl. oz. 8. Mix. One sixth part two or three times a day. *To relieve nausea, or vomiting, with heartburn.*

℞. Tincturæ Valerianæ Ammoniatæ, fl. drs. 3 ; Tincturæ Rhei, fl. drs. 6 ; Tincturæ Lavandulæ Compositæ, fl. oz. 1 ; Aquæ Pimentæ, fl. oz. 8. Mix. One sixth part when oppressed with languor or faintness. *In hypochondriasis and hysteria.*

362. *Ammonia in Effervescence.*

℞. Ammoniæ Carbonatis, gr. 120 ; Acidi Hydrocyanici Diluti, min. 20 ; Tincturæ Cardamomi Compositæ, fl. drs. 6 ; Infusi Aurantii, ad fl. oz. 8. Mix. One sixth part to be made into an effervescing draught with one tablespoonful of fresh lemon juice, or with eighteen grains of citric acid. To be taken twice or thrice daily. *In irritability of the stomach, with depression.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. 4; Potassæ Bicarbonatis, gr. 120; Spiritûs Chloroformi, fl. drs. 6; Tincturæ Hyoscyami, fl. drs. 8; Infusi Cascarillæ, ad fl. oz. 8. Mix. One sixth part every four hours, made into an effervescing draught with one tablespoonful of lemon juice. *In irritable stomach with undue acidity of the secretions.*

363. *Formiate of Ammonia.*

℞. Ammoniæ Formiatis, gr. 30; Aquæ, fl. oz. 8. Mix. One sixth part three times a day. *Recommended by* DR. RAMSKILL *in chronic paralytic disease, accompanied by general torpor. Also in reflex paralysis, and in some forms of epilepsy. It is contra-indicated where there is active disease in the nervous centres, and in cases where the stomach is irritable.*

364. *Phosphate of Ammonia and Ether.*

℞. Ammoniæ Phosphatis, gr. 60—100; Spiritûs Ætheris, fl. drs. 3; Infusi Caryophylli, ad fl. oz. 8. Mix. One sixth part three times a day. *In debility with a tendency to gout or rheumatism. Also in hypochondriasis.*

365. *Hydrochloric Acid and Ether.*

℞. Acidi Hydrochlorici Diluti, fl. drm. 1; Spiritûs Ætheris, fl. drs. 3; Syrupi Aurantii, fl. drs. 6; Infusi Aurantii, ad fl. oz. 8. Mix. One sixth part every six hours. *In continued fever, and in cases where the respired air is ammoniacal.*

366. *Cajuput Oil and Cloves.*

℞. Olei Cajuputi, min. 5; Pulveris Tragacanthæ Compositi, gr. 60; Aquæ Destillatæ, fl. drs. 2. Beat thoroughly together, and add—Infusi Caryophylli, fl. drs. 10. Mix. To be taken occasionally. *In hysteria, flatulent colic, and many spasmodic diseases.*

℞. Olei Cajuputi, min. 4; Sacchari Lactis, gr. 120. Beat up thoroughly, and add—Decocti Aloes Compositi, fl. oz. 1½. Mix. To be taken occasionally, early in the morning. *As a stimulant and laxative, where there is a tendency to flatulence and a loaded rectum.*

367. *Ether and Brandy.*

℞. Spiritûs Ætheris, fl. drs. 3; Spiritûs Vini Gallici, fl. drs. 12; Infusi Cinchonæ Flavæ, ad fl. oz. 8. Mix. One sixth part every four or six hours. *At the commencement of convalescence from many acute diseases.*

℞. Spiritûs Chloroformi, fl. drs. 6; Misturæ Spiritûs Vini Gallici (F. 17), fl. oz. 8. One sixth part every six hours. *In the stages of low fever with restlessness.*

368. *Solution of Chlorinated Soda.*

℞. Liquoris Sodæ Chloratæ, fl. drs. 1—2; Syrupi Tolutani, fl. oz. 1; Tincturæ Serpentariæ, fl. drs. 6; Aquæ, ad fl. oz. 8. Mix. One sixth part every six hours. *In low fever this mixture will clean the tongue, promote the action of the skin and kidneys, correct the offensive state of the evacuations, and rouse the patient.* See F. 354.

℞. Liquoris Sodæ Chloratæ, fl. drm. 1; Tincturæ Cinchonæ Compositæ, fl. drs. 6; Spiritûs Vini Gallici, fl. drs. 12; Tincturæ Cantharidis, min. 40; Aquæ, ad fl. oz. 8. Mix. One sixth part every three or four hours. *In low fever, with great prostration.*

369. *Sumbul, Quinine, Hop, &c.*

℞. Tincturæ Sumbulis, fl. drs. 1—3; Infusi Lupuli, ad fl. oz. 8. Mix. One sixth part three times a day. *In some cases of hysteria, epilepsy, threatened delirium tremens, &c., where a stimulant and antispasmodic is needed.* See F. 95.

℞. Tincturæ Quiniæ, Tincturæ Rhei, Tincturæ Lupuli, āā fl. drs. 4. Mix. One teaspoonful in a wineglassful of water twice a day. *In dyspepsia from weakness of the digestive organs, and constipation.* See F. 385.

370. *Preparations of Oxygen.*

BARTH'S PATENT OXYGEN WATER is sold in bottles which contain nearly half an imperial pint of distilled water, with about 13·5 cubic inches, or 4·6 grains, of gaseous oxygen. The contents of two, three, or four bottles may be taken daily. *The effect is to promote digestion, to render the secretions and excretions healthy, to improve the condition of the blood, and possibly to control nervous force.*

PEROXIDE OF HYDROGEN may be regarded as water supersaturated with oxygen. A solution charged with ten volumes of oxygen is usually employed; the dose varying from fluid drachms 1—4, in two ounces of water, two or three times a day. *Useful in many diseases attended with dyspnœa,—as chronic bronchitis, pulmonary condensation, valvular cardiac disease with congestion of the lungs, some forms of asthma, laryngitis, hooping cough, &c. Also in dyspepsia, congestion of the liver, possibly in diphtheria and croup, as well as in strumous and other ulcerations. It appears likewise to favour the action of steel and cod liver oil; which remedies, however, should not be given at the same hour that the peroxide is administered.*

OXYGEN GAS can be best inhaled by using a large vulcanite bag filled with oxygen and air—1 to 4. This mixture is to be inhaled for half an hour once or twice a day; slowly inspiring it at short intervals, and filling the lungs as much as possible.

MESSRS. ROBBINS & Co. have prepared a powder which they call the "Patent Oxygenator." On placing a wineglassful of this material in the vase of Dr. Beigel's Universal Inhaler, and pouring over it half a pint of boiling water, pure oxygen will be evolved. Inhalation may be practised once or twice a day, for ten or fifteen minutes at a time.

XVII. TONICS.

371. *Bark and Ammonia.*

℞. Ammoniæ Carbonatis, gr. 30; Tincturæ Lavandulæ Compositæ, fl. oz. 1; Infusi Cinchonæ Flavæ, ad fl. oz. 8. Mix. One sixth part every six hours.

℞. Ammoniæ Phosphatis, gr. 60; Tincturæ Aconiti, min. 40; Tincturæ Cinchonæ Compositæ, fl. drs. 6; Aquæ Menthæ Piperitæ, ad fl. oz. 8. Mix. One sixth part three times a day.

℞. Ammoniæ Carbonatis, gr. 30; Extracti Opii Liquidi, min. 30; Spiritûs Ætheris, fl. drs. 3; Decocti Cinchonæ Flavæ, ad fl. oz. 8. Mix. One sixth part every three or four hours. *In cases where it is feared that a deposition of fibrin has taken place in the heart or one of the large vessels.*

℞. Spiritûs Ammoniæ Aromatici, Spiritûs Chloroformi, āā fl. drs. 7; Liquoris Morphiæ Hydrochloratis, fl. drs. 2; Extracti Cinchonæ Flavæ Liquidi, fl. drs. 4;

Tincturæ Cinchonæ Flavæ, ad fl. oz. 3. Mix. Direct,—"One teaspoonful in a wineglassful of Port wine three times a day." *In certain cases of phthisis this mixture is very useful, especially in conjunction with cod liver oil and a liberal diet.*

372. *Ammonia, Bark, and Rhubarb.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. 4; Extracti Cinchonæ Flavæ Liquidi, fl. drs. 1½; Tincturæ Rhei, fl. drs. 4; Infusi Rhei, ad fl. oz. 8. Mix. One sixth part twice or thrice daily. *In nervous depression, &c., with constipation.*

373. *Bark and Liquor Potassæ.*

℞. Liquoris Potassæ, fl. drs. 3; Tincturæ Cinchonæ Compositæ, fl. drs. 6; Decocti Cinchonæ Flavæ, ad fl. oz. 8. Mix. One sixth part twice or thrice daily. *In debility attended with the lithic acid diathesis.*

374. *Bark and Serpentary.*

℞. Tincturæ Cinchonæ Compositæ, fl. oz. 1; Tincturæ Aconiti, min. 30; Tincturæ Serpentariæ, *vel* Tincturæ Acteæ Racemosæ, fl. drs. 3; Aquæ Menthæ Piperitæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In some cases of chronic rheumatism, lumbago, and rheumatoid arthritis.*

375. *Bark and Hemlock.*

℞. Tincturæ Cinchonæ Compositæ, fl. drs. 6; Succi Conii, fl. drs. 4; Aquæ Pimentæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In chronic diseases attended with debility and pain.*

376. *Acid Mixtures and Bark.*

℞. Acidi Sulphurici Aromatici, fl. drs. 2; Syrupi Aurantii, fl. oz. 1; Tincturæ Cinchonæ Compositæ, fl. drs. 6; Infusi Cinchonæ Flavæ, ad fl. oz. 8. Mix. One sixth part twice or thrice daily, on an empty stomach. *Especially useful in depressing disorders accompanied with occasional attacks of hæmorrhage.*

℞. Acidi Phosphorici Diluti, fl. drs. 1½; Syrupi Aurantii, fl. drs. 6; Tincturæ Cinchonæ Compositæ, fl. oz. 1; Infusi Aurantii, ad fl. oz. 8. Mix. One sixth part three times a day. *In debility, with nervous irritability.*

℞. Acidi Nitrici Diluti, *vel* Acidi Phosphorici Diluti, fl. drs. 1½; Tincturæ Nucis Vomicæ, fl. drm. 1; Extracti Cinchonæ Flavæ Liquidi, fl. drs. 2; Aquæ Menthæ Piperitæ, ad fl. oz. 8. Mix. One sixth part three times a day, two hours before each meal. *In general weakness, with nervous exhaustion.*

℞. Acidi Acetici Glaciale, min. 20—35; Tincturæ Belladonnæ, Extracti Cinchonæ Flavæ Liquidi, āā fl. drs. 4; Tincturæ Cardamomi Compositæ, fl. oz. 2. Mix and label,—"One small teaspoonful in a wineglassful of water twice or three times a day." *After operations on cancerous growths, to prevent recurrence.*

Use Ext. Sarsæ Liq. as vehicles for tonics when there is any fear of old syphilitic taint.

377. *Acid Mixtures with Calumba, &c.*

℞. Tincturæ Calumbæ, fl. drs. 6; Acidi Sulphurici Aromatici, fl. drs 1½; Syrupi Aurantii, fl. oz. 1; Infusi Aurantii, ad fl. oz. 8. Mix. One sixth part three times a day, when the stomach is empty.

℞. Acidi Hydrochlorici Diluti, fl. drs. 1½; Acidi Hydrocyanici Diluti, min. 20; Infusi Chiratæ, ad fl. oz. 8. Mix. One sixth part three times a day, immediately before the meals. *As a stomachic, especially in the dyspepsia of gouty subjects.*

℞. Succi Limonis Recentis, fl. drs. 12; Syrupi Limonis, fl. oz. 1; Infusi Chiratæ, ad fl. oz. 8. Mix. One sixth part three times a day. *Where there is debility with a threatening of rheumatic fever. In cancer of the stomach, &c.*

Glycerine mixed with tonics, especially preparations of steel, increases their efficacy and obviates their constipating effects.

378. *Nitro-Hydrochloric Acid Mixtures.*

℞. Acidi Nitro-Hydrochlorici Diluti, fl. drs. 1½—3; Tincturæ Chiratæ, fl. drs. 3; Tincturæ Aconiti, min. 30; Syrupi Aurantii, fl. oz. 1; Infusi Aurantii, ad fl. oz. 8. Mix. One sixth part three times a day, an hour before each meal. *In oxaluria, dyspepsia, rheumatoid arthritis, &c.*

℞. Acidi Nitro-Hydrochlorici Diluti, fl. drs. 2; Acidi Hydrocyanici Diluti, min. 25; Succi Taraxaci, fl. drs. 6; Tincturæ Gentianæ Compositæ, fl. oz. 1; Infusi Sennæ, ad fl. oz. 8. Mix. One sixth part twice or thrice daily. *In dyspepsia, with sluggish action of the liver.* The efficacy of this mixture may often be increased by giving with each dose a pill containing one or two grains of sulphate of zinc and four of extract of gentian.

℞. Acidi Nitro-Hydrochlorici Diluti, fl. drs. 2; Liquoris Strychniæ, min. 30—fl. drm. 1; Spiritûs Chloroformi, fl. drs. 6; Tincturæ Zingiberis, fl. drs. 3; Aquæ, ad fl. oz. 8. Mix. One eighth part, with a large tablespoonful of water, three times a day. *In any form of functional paralysis after all the appreciable causes are remedied. Also in obstinate debility, hypochondriasis, atonic dyspepsia, diabetes insipidus, alkaline urine, &c.*

℞. Acidi Nitro-Hydrochlorici Diluti, fl. drs. 1½; Tincturæ Belladonnæ, fl. drm. 1; Extracti Pareiræ Liquidi, fl. drm. 1; Decocti Pareiræ, ad fl. oz. 8. Mix. One sixth part, with one of the following pills, every six hours:—

℞. Acidi Benzoici, gr. 30; Glycerini, sufficient to make a mass. Divide into six pills, and silver them. *In incontinence of urine, when the reaction of the latter is alkaline. Also in some forms of hepatic congestion.*

379. *Quinine Mixtures and Pills.*

℞. Quiniæ Sulphatis, gr. 12; Acidi Nitrici Diluti, *vel* Acidi Phosphorici Diluti, *vel* Acidi Hydrochlorici Diluti, *vel* Acidi Sulphurici Aromatici, fl. drs. 1½; Tincturæ Lupuli, fl. drs. 6; Aquæ, ad fl. oz. 8. Mix. One sixth part three times a day. *Amongst other purposes, this mixture may be used to check the night sweats in phthisis.*

℞. Tincturæ Quiniæ, fl. drs. 14; Tincturæ Zingiberis Fortioris, fl. drs. 2; Glycerini, fl. oz. 1. Mix. One teaspoonful in a wineglassful of water three times a day. *In neuralgia, nervous irritability, weakness, &c.*

℞. Quiniæ Sulphatis, gr. 18; Extracti Lupuli, gr. 40. Make a mass, divide into twelve pills, and order one to be taken three times a day.

℞. Quiniæ Sulphatis, gr. 4; Acidi Phosphorici Diluti, min. 20; Syrupi Aurantii, fl. drs. 4; Aquæ, ad fl. oz. 4. Mix. One small tablespoonful three times a day. *In strumous ophthalmia and other cases of debility in children.*

℞. Quiniæ Sulphatis, gr. 64; Acidi Sulphurici Diluti, min. 10; Aquæ, fl drs. 4. Mix. From fifteen minims to half a drachm (gr. 4—8) may be carefully injected into the subcutaneous connective tissue. Only a clear solution is to be used. Absorption of quinine merely suspended in fluid, is at least uncertain; the alkaloid must be in solution. The injection may have to be repeated three, four, or more times before a cure is effected. *In intermittent fever, &c.*

The annexed for subcutaneous injection does not answer: the quinine will not dissolve. This is better—Quiniæ Sulphatis Neutralis, gr. 30; Acidi Sulphurici Aromatici, min. 5; Aquæ, fl. drs. 2. Mix.

380. *Quinine and Steel.*

℞. Quiniæ Sulphatis, Ferri Sulphatis, āā gr. 12; Liquoris Strychniæ, min. 30; Acidi Sulphurici Aromatici, fl. drs. 1½; Infusi Quassiæ, ad fl. oz. 8. Mix. One sixth part three times a day. *The black stools which are passed while any preparation of steel is being taken, are due to the combination of the metal with part of the sulphur of the food—forming sulphuret of iron.*

℞. Quiniæ Sulphatis, gr. 9; Acidi Hydrochlorici Diluti, fl. drm. 1; Tincturæ Arnicæ, min. 30—fl. drm. 1; Tincturæ Ferri Perchloridi, fl. drs. 1½; Infusi Caryophylli, ad fl. oz. 8. Mix. One sixth part three times a day. *In general debility, diphtheria, erysipelas, &c.*

℞. Quiniæ Sulphatis, gr. 12; Tincturæ Ferri Perchloridi, fl. drs. 2; Tincturæ Nucis Vomicæ, fl. drm. 1; Tincturæ Lupuli, fl. drs. 6; Magnesiæ Sulphatis, oz. 1; Infusi Lupuli, ad fl. oz. 8. Mix. One sixth part daily, three hours after breakfast. *In habitual constipation with debility.*

℞. Quiniæ Sulphatis, Ferri Sulphatis Exsiccatæ, āā gr. 20; Extracti Hyoscyami, gr. 30. Make a mass, divide into twelve pills, and order one to be taken twice a day. *In debility with irritability of the nervous system.*

℞. Quiniæ Sulphatis, gr. 12; Ferri Redacti, gr. 30; Extracti Aconiti, gr. 12; Glycerini, sufficient to form a mass. Divide into twelve pills, and order one to be taken an hour after dinner and supper. *In neuralgia, rheumatoid arthritis, painful chronic affections with debility, &c.*

℞. Ferri et Quiniæ Citratis, gr. 30; Tincturæ Chiratæ, fl. drs. 1½; Aquæ, ad fl. oz. 8. Mix. One sixth part three times a day. *An excellent tonic where there is exhaustion, with a weak and irritable stomach. If the strong bitter is objectionable, Tincture of Lemon Peel may be substituted for the Chirata.*

381. *Quinine, Steel, and Arsenic.*

℞. Tincturæ Quiniæ, fl. oz. 1; Liquoris Arsenicalis, min. 18; Ferri et Ammoniæ Citratis, gr. 30; Aquæ Aurantii, ad fl. oz. 8. Mix. One sixth part two or three times a day, after meals. *In diseases of the skin, &c., with impoverished blood.*

℞. Quiniæ Sulphatis, gr. 9; Acidi Phosphorici Diluti, Tincturæ Ferri Perchloridi, āā fl. drs. 1½; Liquoris Arsenici Hydrochlorici, min. 15—40; Syrupi Zingiberis, fl. drs. 6; Aquæ Cinnamomi, *vel* Infusi Quassiæ, ad fl. oz. 8. Mix. One sixth part directly after breakfast, dinner, and supper. *In many skin diseases, rheumatoid arthritis, carbuncular inflammation, &c.* See F. 52, 399.

382. *Quinine and Iodide of Iron.*

℞. Tincturæ Quiniæ, fl. oz. 1; Syrupi Ferri Iodidi, fl. drs. 3—6; Infusi Calumbæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In debility with a strumous taint, chronic rheumatism, tertiary syphilis, goitre, &c.*

383. *Quinine and Belladonna.*

℞. Quiniæ Sulphatis, gr. 24; Extracti Belladonnæ, gr. 4; Camphoræ, gr. 30; Confectionis Rosæ Gallicæ, sufficient to make a mass. Divide into twelve pills, silver them; and order one to be taken twice or thrice daily, in conjunction with one teaspoonful of good vinegar mixed with a wineglassful of sugared water. *In some painful diseases (neuralgia, cancer, dysmenorrhœa, &c.), where a sedative and tonic are needed.* See F. 44.

384. *Quinine and Ipecacuanha.*

℞. Quiniæ Sulphatis, gr. 12; Pulveris Ipecacuanhæ, gr. 12—24; Extracti Gentianæ, gr. 24. Mix. Divide into twelve pills, and order one to be taken every day at dinner. *An excellent remedy in cases of slow digestion.* See F. 44.

385. *Quinine and Rhubarb.*

℞. Quiniæ Sulphatis, gr. 24; Pulveris Rhei, gr. 36; Extracti Lupuli, gr. 40. Mix. Divide into twenty-four pills, and order two to be taken night and morning.

386. *Quinine and Ammonia.*

℞. Tincturæ Quiniæ, fl. oz. 1; Glycerini, fl. drs. 6; Spiritûs Ammoniæ Aromatici, Spiritûs Ætheris, āā fl. drs. 3; Extracti Opii Liquidi, min. 30; Infusi Aurantii, *vel* Infusi Cinchonæ Flavæ, ad fl. oz. 8. Mix. One sixth part every six hours. *In great exhaustion, with low muttering delirium and restlessness.*

387. *Quinine and Nux Vomica.*

℞. Quiniæ Sulphatis, gr. 18; Extracti Nucis Vomicæ, gr. 3—6; Extracti Gentianæ, gr. 35. Mix, and divide into twelve pills. One to be taken night and morning. *In debility with constipation.* See F. 175, 409.

388. *Substitutes for Quinine.*

℞. Beberiæ Sulphatis, gr. 30; Acidi Sulphurici Aromatici, min. 40; Syrupi Aurantii, fl. oz. 1; Aquæ Aurantii Floris, ad fl. oz. 8. Mix. One sixth part three times a day. *In neuralgic affections assuming a periodic character; as well as in intermittent and remittent fevers. Beberia does not produce cerebral disturbance and headache like quinine. This sulphate of an alkaloid is said to be an ingredient of* WARBURG'S *Fever drops.*

℞. Salicini, gr. 60; Extracti Sarsæ Liquidi, fl. drs. 6; Infusi Gentianæ Compositi, ad fl. oz. 8. Mix. One sixth part three times a day. *During convalescence from acute disorders of the digestive organs. The antiperiodic properties of salacin render it useful in intermittent and some other fevers.*

℞. Salicini, gr. 120; Glycerini, fl. oz. 1; Tincturæ Aurantii, ad fl. oz. 3. Mix. One teaspoonful in a wineglassful of water night and morning. *Where the stomach is easily nauseated and cannot digest quinine, this formula will be useful.*

389. *Cod Liver Oil.*

The oil most commonly used is of a pale straw colour, the dose varying from a teaspoonful to a large tablespoonful twice or thrice daily. It should be taken immediately after meals; floating it on milk, coffee, beef tea, orange juice, orange wine, brandy and water, cherry brandy, &c. Chewing a piece of lemon peel or cinnamon, or a few cloves previously, will disguise the flavour. Sometimes it is preferred made into an emulsion; which may be done by beating it up with an equal proportion of lime water, or of milk, or with the yolk of an egg and some compound tincture of cardamoms. When the oil proves indigestible, giving rise to nausea or unpleasant eructations, the stomach can often be made to tolerate it by administering some preparation of pepsine (F. 420) with each dose. DR. DE JONGH'S oil is pure, and is prescribed by many practitioners.

Cod liver oil may be impregnated with various drugs,—such as any of the essential oils, morphia, arsenic, iodine, mercury, quinine, zinc, iron, &c. Too large a quantity of the solution must not be made at a time, as the oil soon becomes rancid.

Combined with ozone [an allotropic modification of oxygen—ἄλλος = another + τρόπος = manner of existence,] it has been found to lessen considerably the frequency of the pulse in phthisis. The dose of ozonized oil, according to Dr. E. Symes Thompson, is from two to four drachms, two or three times a day. See F. 22, 32, 283, 390, and 418.

390. *Iodide of Iron and Cod Liver Oil.*

℞. Syrupi Ferri Iodidi, fl. drs. 4; Mucilaginis Tragacanthæ, fl. oz. 1; Olei Morrhuæ, fl. oz. 4½. Mix. One tablespoonful twice or thrice daily. *In some forms of scrofula, phthisis, mild constitutional syphilis, &c.*

℞. Potassii Iodidi, gr. 3—5; Glycerini, fl. drs. 2; Vini Ferri, fl. drs. 4; Olei Morrhuæ, fl. drs. 6. Mix, and make a draught to be taken twice a day. *In chronic rheumatism, tertiary syphilis, strumous skin diseases, &c.*

391. *Steel and Cocoa-nut Oil.*

℞. Olei Cocos Nucis, fl. drs. 2; Spiritûs Ammoniæ Aromatici, min. 30; Ferri et Ammoniæ Citratis, gr. 5; Aquæ Menthæ Piperitæ, ad fl. oz. 1. Mix, and make a draught to be taken twice or thrice daily. *Deserving of trial when cod liver oil causes nausea.*

392. *Steel and Glycerine.*

℞. Tincturæ Ferri Perchloridi, fl. drs. 1½—2; Zinci Phosphatis, gr. 6; Spiritûs Chloroformi, fl. drs. 3; Glycerini, fl. oz. 1; Aquæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In some cases it is better to omit the glycerine from this mixture; administering cod liver oil instead, after one or two of the chief meals of the day.*

℞. Tincturæ Ferri Perchloridi, fl. drs. 2—4; Glycerini, fl. drs. 4; Tincturæ Cardamomi Compositæ, fl. oz. 1; Aquæ, ad fl. oz. 8. Mix. One eighth part every three or four hours. *In diphtheria, erysipelas with albuminuria, &c.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. 4; Ferri et Ammoniæ Citratis, gr. 40; Infusi Quassiæ, fl. oz. 6½; Glycerini, fl. oz. 1. Mix. One sixth part three times a day. *In general debility, with a torpid state of the colon.*

393. *Steel and Digitalis.*

℞. Tincturæ Ferri Perchloridi, min. 80; Infusi Digitalis, fl. oz. 2; Aquæ Camphoræ, ad fl. oz. 8. Mix and label,—"One eighth part, with one tablespoonful of water, three times a day." *In some forms of cardiac and renal dropsy, &c.*

394. *Steel and Pepsine.*

℞. Ferri Redacti, gr. 12—60; Pepsinæ Porci, gr. 36; Zinci Phosphatis, gr. 18; Glycerini, sufficient to make a mass. Divide into twenty-four pills, silver them, and order two to be taken every day at dinner. *In anæmia, &c., with weakness of the digestive organs.*

℞. Ferri et Ammoniæ Citratis, gr. 20; Spiritûs Vini Gallici, fl. oz. 1. Vini Pepsinæ, fl. drs. 4; Aquæ, ad fl. oz. 6. Mix. One half to be taken every day at dinner. See F. 420.

395. *Steel and Hemlock.*

℞. Pilulæ Ferri Carbonatis, gr. 60; Extractii Conii, gr. 36—60. Mix, and divide into twenty-four pills. Two to be taken twice or thrice daily. *In incipient phthisis, and in many diseases attended with cough and debility.*

396. *Steel Electuaries.*

℞. Ferri Peroxidi Hydrati, Mellis Depurati, āā oz. 2. Mix. One teaspoonful twice a day. *In chorea, &c.*

℞. Ferri Carbonatis Saccharatæ, gr. 120—240; Oxymellis, fl. oz. 3. Mix. One teaspoonful twice or thrice daily after meals. Where there is no objection to pills it will be better to prescribe from 5—10 grs. of the officinal PILULA FERRI CARBONATIS twice a day.

397. *Steel and Hydrochloric Acid.*

℞. Tincturæ Ferri Perchloridi, fl. drs. 1½; Acidi Hydrochlorici Diluti, fl. drs. 2; Spiritûs Chloroformi, fl. drs. 3; Infusi Quassiæ, ad fl. oz. 8. Mix. One sixth part three times a day. See F. 101.

398. *Steel and Gentian.*

℞. Ferri Sulphatis Granulatæ, Extracti Gentianæ, āā gr. 30. Mix, divide into twelve pills, and order one to be taken three times a day. *In chlorosis, &c.*

399. *Steel and Arsenic.*

℞. Vini Ferri, fl. oz. 4; Liquoris Arsenicalis, min. 20; Syrupi Zingiberis, fl. oz. 2. Mix. One sixth part, with three tablespoonfuls of water, three times a day, immediately after meals. *For cases of purpura. In reduced doses as a tonic and alterative in some of the skin diseases of children.* See F. 52, 381, 402.

℞. Syrupi Ferri Phosphatis, fl. oz. 2; Liquoris Sodæ Arseniatis, min. 30. Mix. One teaspoonful in a wineglassful of water directly after dinner and supper. *In some forms of spleen disease, &c.*

400. *Steel and Cantharides.*

℞. Tincturæ Cantharidis, fl. drs. 1½; Glycerini, fl. oz. 1; Misturæ Ferri Compositæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In debility of the generative organs, some forms of incontinence of urine, &c.*

℞. Tincturæ Cantharidis, Tincturæ Ferri Perchloridi, āā fl. drm. 1; Tincturæ Capsici, fl. drs. 1½; Syrupi Hemidesmi, fl. oz. 1; Aquæ, ad fl. oz. 8. Mix. One sixth part three times a day.

401. *Steel and Ammonia.*

℞. Ferri Tartarati, gr. 60; Spiritûs Ammoniæ Aromatici, fl. drs. 3; Infusi Quassiæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In chlorosis, leucorrhœa from relaxation of vaginal mucous membrane, &c.*

℞. Ferri et Ammoniæ Citratis, gr. 40; Ammoniæ Carbonatis, gr. 30; Tincturæ Zingiberis, fl. drs. 3; Aquæ, ad fl. oz. 8. Mix. One sixth part three times a day.

402. *Steel and Chlorate of Potash.*

℞. Tincturæ Ferri Perchloridi, fl. drs. 1½; Potassæ Chloratis, gr. 120; Liquoris Arsenicalis, min. 15; Aquæ, ad fl. oz. 8. Mix. One sixth part three or four times a day, in a wineglassful of water. *In certain skin diseases, onychia, &c. Also in anæmia dependent on a syphilitic taint, in erysipelas about the fauces, and in tonsillitis, &c., omitting the solution of arsenic from the mixture.*

403. *Steel and Citrate of Potash.*

℞. Ferri et Ammoniæ Citratis, gr. 60; Spiritûs Ammoniæ Aromatici, fl. drs. 4; Potassæ Bicarbonatis, gr. 120; Infusi Calumbæ, ad fl. oz. 8. Mix. One sixth part to be taken twice a day with one tablespoonful of lemon juice. *As a tonic during convalescence from many acute diseases, especially where there is a tendency to nausea and dyspepsia.*

404. *Steel and Aloes.*

℞. Ferri Carbonatis Saccharatæ, gr. 40; Infusi Anthemidis, fl. oz. 8. Mix. One sixth part twice a day. The following draught is also to be taken every other morning before breakfast:—℞. Sodæ Phosphatis, gr. 120; Extracti Rhei, gr. 10; Decocti Aloes Compositi, fl. drs. 4; Aquæ Carui, fl. oz. 1. Mix. *Useful for atonic gouty subjects.*

℞. Ferri Redacti, gr. 30; Pilulæ Aloes et Myrrhæ, gr. 24—40; Extracti Nucis Vomicæ, gr. 4. Make a mass, divide into twelve pills, and order one to be taken three times a day. *In anæmia with constipation.*

℞. Misturæ Ferri Compositæ, Decocti Aloes Compositi, āā fl. oz. 4; Zinci Sulphatis, gr. 12. Mix. One sixth part twice a day. *In anæmia, hypochondriasis, general debility with constipation, &c.*

405. *Phosphate of Iron.*

℞. Ferri Phosphatis, gr. 40; Acidi Phosphorici Diluti, fl. drs. $1\frac{1}{2}$; Syrupi Aurantii Floris, fl. oz. 1; Mucilaginis Tragacanthæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In scrofula, cancer, low nervous vigour, &c.*

℞. Ferri Phosphatis, gr. 20; Pulveris Myrrhæ, gr. 15; Sacchari Albi, gr. 30. Mix, and divide into six powders. One to be taken night and morning. *In rickets, and in all the strumous diseases of children.*

A syrup of the Phosphates of Iron, Lime, Soda, and Potassa has been prepared by Mr. PARRISH, of Philadelphia. It may be obtained from most London chemists; being known as "Chemical Food." The dose for a child ten years of age, is one teaspoonful in water after the two principal meals of the day. This measure contains one grain of phosphate of iron; two and a half grains of phosphate of lime; and smaller portions of the alkaline phosphates. *Chemical Food is a preparation of great value in all forms of strumous diseases, and general debility.*

406. *Steel and Manganese.*

℞. Ferri Phosphatis, gr. 120; Manganesii Phosphatis, gr. 90; Tincturæ Calumbæ, fl. oz. 1; Syrupi Zingiberis, fl. oz. 2. Mix. One teaspoonful in a wineglassful of water three times a day. *In chlorosis, scrofula, &c.*

407. *Acetate of Strychnia.*

℞. Strychniæ Acetatis, gr. 1; Acidi Acetici, min. 20; Alcoholis, fl. drs. 2; Aquæ Destillatæ, fl. drs. 6. Mix. Ten drops (= to gr. $\frac{1}{50}$) to be taken in water three times a day. *Recommended by* DR. MARSHALL HALL *as a tonic in cases of nervous exhaustion.*

℞. Strychniæ, gr. 1; Pulveris Zingiberis, gr. 40; Extracti Gentianæ, gr. 60. Mix very thoroughly, divide into twenty pills, and order one to be taken night and morning. *In partial paralysis, amaurosis, &c., when the acute symptoms have subsided.*

408. *Strychnia and Steel.*

℞. Ferri et Ammoniæ Citratis, gr. 40 ; Liquoris Strychniæ, min. 30 (=to gr. $\frac{1}{4}$) ; Infusi Quassiæ, ad fl. oz. 8. Mix. One eighth part twice a day. *In chronic nervous affections with debility.*

℞. Ferri Redacti, gr. 40 ; Zinci Valerianatis, gr. 20 ; Strychniæ, gr. 1 ; Glycerini, sufficient to make a mass. Divide very carefully into twenty pills, silver them, and direct one to be taken three times a day, after food. *In hypochondriasis, great nervous depression, &c.*

409. *Zinc and Nux Vomica.*

℞. Zinci Sulphatis, gr. 24; Extracti Nucis Vomicæ, gr. 6; Extracti Rhei, gr. 30. Make a mass, divide into twelve pills, and order one to be taken twice a day. *In weakness of the muscular system, atony of intestinal walls, &c.* See F. 177, 387.

410. *Valerianate of Zinc.*

℞. Zinci Valerianatis, gr. 12—24 ; Extracti Belladonnæ, gr. 3—6 ; Extracti Gentianæ, gr. 24. Make a mass, divide into twelve pills, and silver them. One to be taken three times a day. *In some nervous disorders, in cases of habitual constipation, and in spasmodic contraction of the sphincter ani.*

℞. Zinci Valerianatis, Zinci Phosphatis, āā gr. 10; Extracti Rhei, gr. 24. Make a mass, divide into twelve pills, and silver them. Order one to be taken three times a day. *For epilepsy, neuralgia, hysteria, &c. The valerianate of quinine, of soda, of ammonia, and of steel, may be employed in the same manner. In some cases of neuralgia as many as twelve or twenty grains of valerianate of ammonia in infusion of calumba have been given every four hours.*

411. *Valerianate of Zinc and Quinine.*

℞. Zinci Valerianatis, gr. 12 ; Quiniæ Sulphatis, gr. 6 ; Pilulæ Rhei Compositæ, Extracti Anthemidis, āā gr. 20. Make a mass, divide into twelve pills, and silver them. One to be taken three times a day. *In hysteria, neuralgia, &c.*

412. *Valerianate of Steel and Savin.*

℞. Ferri Valerianatis, gr. 24 ; Olei Sabinæ, min. 24; Pilulæ Assafœtidæ Compositæ, gr. 30. Make a mass, divide into twelve pills, and silver them. One to be taken three times a day. *In anæmia, hysteria, and neuralgia, with amenorrhœa.*

413. *Sulphate of Zinc.*

℞. Zinci Sulphatis, gr. 24 ; Extracti Aconiti, gr. 12 ; Extracti Quassiæ, gr. 24. Make a mass, divide into twelve pills, and order one to be taken three times a day. *In epilepsy with neuralgic pains, lumbago, pleurodynia, &c. Its efficacy is much increased by giving cod liver oil at the same time.*

℞. Zinci Sulphatis, gr. 12—24 ; Extracti Conii, gr. 36. Make a mass, divide into twelve pills, and order one to be taken three times a day. *In the chronic bronchitis of old people as a tonic and sedative, &c.*

414. *Phosphate of Zinc, &c.*

℞. Zinci Phosphatis, gr. 20—40 ; Acidi Phosphorici Diluti, fl. drs. $1\frac{1}{2}$; Tincturæ Cinchonæ Flavæ, fl. drs. 6, *vel* Tincturæ Ferri Perchloridi, fl. drs. $1\frac{1}{2}$; Aquæ

Menthæ Piperitæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In some affections of the nervous system with debility.*

℞. Zinci Phosphatis, gr. 20; Extracti Nucis Vomicæ, gr. 5; Extracti Gentianæ, gr 20. Mix. Divide into twenty pills, silver them, and order one to be taken twice a day.

415. *Oxide of Zinc.*

℞. Zinci Oxidi, gr. 24—40; Extracti Anthemidis, gr. 30. Make a mass, divide into twelve pills, and order one to be taken twice a day. *In chronic alcoholism (?), chorea, hysteria, &c.* DR. GOLDING BIRD *entertained an opinion that zinc has a specific influence on the nervous system, just as iron has on the blood. The dose may be gradually increased until twenty or even thirty grains of the zinc are taken in the day. It can sometimes be advantageously combined with opium.*

416. *Zinc, Bark, and Glycerine.*

℞. Zinci Sulphatis, gr. 12—20; Tincturæ Cinchonæ Compositæ, fl. oz. 1; Glycerini, fl. drs. 12; Aquæ Menthæ Piperitæ, ad fl. oz. 8. Mix. One sixth part three times a day. *During convalescence from acute disease, especially where there is emaciation with great nervousness and constipation.*

417. *Phosphorus Pills.*

℞. Micæ Panis, gr. 60; Aquæ Destillatæ, sufficient to make a mass. Then add—Phosphori, gr. 1; Mix thoroughly, divide into twenty pills, and order one to be taken thrice daily. *In extreme debility and mental depression. In various affections of the nervous system. After cholera, diphtheria, &c.*

Phosphorus pills and Phosphorus capsules, in which the Phosphorus is defended from the rapid oxidation to which it is liable, are prepared by several houses, and may be obtained through most chemists. Of these the capsules or pearls, which contain $\frac{1}{30}$ of a grain of Phosphorus dissolved in oil, are by far the best.

418. *Phosphorus and Oil and Tincture of Phosphorus.*

℞. Phosphori, gr. 1; Olei Morrhuæ, fl. oz. 6. Mix. One or two teaspoonfuls three times a day, immediately after food. *In tuberculosis, rickets, scrofula, &c.*

℞. Phosphori, gr. 1; Olei Amygdalæ, fl. oz. 3. Mix. One teaspoonful in a wineglassful of barley water three times a day.

℞. Phosphori, gr. 1; Alcohol, fl. dr. 5; Glycerini, fl. oz. 1½; Spiritûs Vini Rectificati, fl. dr. 2; Spiritûs Menthæ Piperitis, fl. dr. ½.
Dissolve the Phosphorus in the Alcohol by the aid of heat; warm together the Glycerine and Spirit of Wine. Mix while hot, and add the Spirit of Peppermint on cooling; fl. dr. 1 contains gr. $\frac{1}{12}$ of Phosphorus. Employed by MR. J. ASHBURTON THOMPSON in the treatment of neuralgia.

419. *Hypophosphite of Soda.*

℞. Sodæ Hypophosphitis *vel* Calcis Hypophosphitis, gr. 30—90; Infusi Chiratæ, fl. oz. 8. Mix. One sixth part three times a day. *In phthisis, tabes mesenterica, &c.* In *progressive locomotor ataxy* the efficacy of this mixture may be increased by giving a pill containing Nitrate of Silver (F. 59) with each dose.

℞. Sodæ Hypophosphitis, gr. 80—240; Spiritûs Ætheris, fl. oz. 1; Tincturæ Sumbulis, *vel* Tincturæ Cinchonæ Flavæ, fl. oz. 2; Aquæ, fl. oz. 3. Mix. One dessertspoonful in a large wineglassful of water three times a day. *In epilepsy, hysteria, neuralgia, some forms of hypochondriasis, &c., this mode of administering phosphorus may be useful. The dose at first should be moderate and then gradually increased. In very obstinate or severe cases of neuralgia, a cure may perhaps be effected by the hypophosphite of soda in forty or even sixty grain doses, repeated thrice daily, when the ordinary quantities have no effect. Where no appreciable benefit ensues in five or six days, the remedy will probably prove useless however long it may be continued.*

420. *Preparations of Pepsine and Pancreatine.*

The physician is sometimes hindered in the administration of tonics and cod liver oil and animal food by the inability of the stomach to digest them. And this frequently happens where these restoratives are most needed,—in cases of degeneration of tissue, in lingering illness, and during convalescence from acute disease.

The food is subjected in the stomach to the action of the gastric juice; a secretion consisting of water, probably of lactic and hydrochloric acids, and of an azotized substance having the nature of a ferment—pepsine. When from any cause the secretion of the gastric glands is deficient or arrested, recourse may be had to the use of artificial pepsine with great advantage. The substance is usually prepared from several rennet bags (the fourth stomach of the ruminants) by washing them, and scraping off the mucous membrane. The latter is then reduced to a pulp, macerated in distilled water for twelve or twenty-four hours, and filtered. A sufficiency of acetate of lead is added to the liquor, the precipitate is collected, and a current of sulphuretted hydrogen passed through it. Then it is again filtered, evaporated at a low temperature, and the dry residue (pepsine) powdered.—The chief symptoms which call for the use of this agent, are—imperfect or slow digestion, with flatulence, acid eructations, nausea, low spirits, and lassitude; diarrhœa, with portions of undigested food in the evacuations; phthisis, cancer, and other diseases attended with great debility; and affections of the stomach itself,—as gastric ulcer, malignant disease of the pylorus, &c. It is also beneficial in anæmia and chlorosis, in habitual constipation, want of appetite, offensive breath, dilated stomach, morbidly fetid stools, and sometimes in the sickness of pregnancy.

Pepsine should be given alone, or it may be mixed with certain medicines without its properties becoming deteriorated. Thus, when severe pain follows the ingestion of food, the sixth of a grain of morphia can be added to each dose; when there is pyrosis, fifteen grains of the white bismuth; when the peristaltic movements are sluggish, the twentieth or twenty-fifth part of a grain of strychnia; and when there is anæmia, some preparation of steel—particularly the reduced iron, or the citrate of iron and quinia. It is a common occurrence for patients to be enabled to assimilate ferruginous tonics and cod liver oil by the aid of pepsine, who cannot do so without.

There are several preparations of this agent which may be used. In BOUDAULT'S *Poudre Nutrimentive*, as purchased from Mr. SQUIRE, the pepsine is mixed with starch in such proportions, that one part of the powder so formed will have the power of digesting four parts of fibrin at a temperature of 98° Fahr. Thus, fifteen grains of the powder will probably cause the meat of a mutton chop to be digested in the stomach. This, then, is the ordinary dose; and it should be taken at the commencement of the meal, either between two pieces of bread, or in a tablespoonful of lukewarm soup.

MORSON'S *Pepsine Wine* is obtained from the gastric juice of the calf's stomach. It is an agreeable, slightly acidulous wine; the dose being one teaspoonful in water. The *Pepsine Lozenges* prepared by the same chemist are convenient and agreeable.

BULLOCK and REYNOLDS' *Pepsina Porci* is procured, as its name implies, from the stomach of the pig. In a short series of experiments its action was found by the Author superior to that of most other kinds. The dose is from two to five grains, made into a pill with glycerine.

And lastly there is the *Rennet* or *Pepsine Wine* of Dr. ELLIS, of Dublin, the preparation of which may be thus described. Take the stomach of a calf as fresh as it can be obtained from the butcher: cut off about three or four inches of the upper or cardiac extremity, which, containing few glandular follicles, may be thrown away. Slit up the organ longitudinally; and wipe it gently with a dry napkin, taking care to remove as little of the clean mucus as possible. Then cut it into small pieces (the smaller the better), and put all into a common wine bottle. Fill up the bottle with good sound sherry, and let it remain corked for a fortnight; at the end of this time it is fit for use. The dose is a teaspoonful in a wineglassful of water immediately after meals. Dr. Ellis also suggests this test for pepsine:—Put a small cup containing milk in a vessel of hot water until the milk becomes blood-warm. Then add a teaspoonful of rennet wine; and if it be genuine, the milk in two or three minutes will became as solid as blancmange.—See F. 389, 394.

The pancreatic juice has for its chief purpose the emulsification of the fatty constituents of food, and when there is difficulty in the digestion of fats, or when, from disease of the pancreas or obstruction of its duct, the pancreatic juice does not reach the duodenum, so that unchanged fat appears in the stools, pancreatine has been given, or fatty matters already subjected to the action of this substance. The following emulsion of cod liver oil and pancreatine is recommended by Dr. Richd. Mathieson:—

Pancreatini Saccharati, oz. 1; Aquæ, oz. 4; Sacchari Albi, oz. 7; Ol. Morrhuæ, Ojss; Ol. Gaultheria, min. 20; Ol. Amygd. Amar. min. 5.

The pancreatine is rubbed with the sugar and water; the syrup then mixed with the oils. A little lime water may be substituted for part of the water.

A pancreatic emulsion of solid fats is prepared by Messrs. Savory and Moore.

XVIII. UTERINE THERAPEUTICS.

421. *Ferruginous Emmenagogues.*

℞. Potassii Iodidi, gr. 18—30; Ferri et Ammoniæ Citratis, gr. 40; Tincturæ Nucis Vomicæ, fl. drm. 1; Infusi Quassiæ, ad fl. oz 8. Mix. One sixth part three times a day. *In amenorrhœa with a torpid circulation.*

℞. Syrupi Ferri Iodidi, Glycerini, āā fl. oz. 1; Olei Limonis, min. 10. Mix. One teaspoonful in a wineglassful of water three times a day. See F. 32.

℞. Pilulæ Ferri Carbonatis, gr. 30; Pilulæ Cambogiæ Compositæ, gr. 15; Olei Sabinæ, min. 12. Make a mass, divide into twelve pills, and order two to be taken twice a day. *In amenorrhœa with anœmia and habitual constipation.*

℞. Ferri Valerianatis, gr. 18; Olei Sabinæ, min. 24; Extracti Aloes Barbadensis, gr. 6; Pilulæ Assafœtidæ Compositæ, gr. 36. Mix thoroughly, and divide into twelve pills. One to be taken three times a day. *In amenorrhœa with hysteria.* See F. 412.

℞. Tincturæ Ferri Perchloridi, fl. drs. 1½; Potassæ Chloratis, gr. 60; Tincturæ Acteæ Racemosæ, fl. drs. 4; Infusi Serpentariæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In debility, with imperfect menstruation, pains in the back, and an irritable condition of the buccal or gastric mucous membrane.* See F. 320.

422. *Stimulant Emmenagogues.*

℞. Extracti Ergotæ Liquidi, fl. drs. 3; Tincturæ Serpentariæ, fl. drs. 6; Tincturæ Nucis Vomicæ, fl. drm. 1; Decocti Aloes Compositi, ad fl. oz. 8. Mix. One sixth part early every morning. *In amenorrhœa dependent on simple atony of the uterine organs.*

℞. Potassii Bromidi, gr. 60; Tincturæ Cantharidis, fl. drs. 1½; Tincturæ Cinnamomi, fl. drs. 6; Aquæ, ad fl. oz. 8. Mix. One sixth part three times a day. *In amenorrhœa with epileptoid seizures.*

℞. Olei Rutæ, min. 15; Extracti Ergotæ Liquidi, fl. drs. 2; Mucilaginis Tragacanthæ, ad fl. oz. 8. Mix. One sixth part three times a day.

℞. Boracis, gr. 60; Tincturæ Ergotæ, fl. drs. 4; Aquæ Cinnamomi, ad fl. oz. 8. Mix. One sixth part three times a day.

℞. Tincturæ Hellebori (Phar. Lond. 1851), fl. drs. 3; Syrupi Zingiberis, fl. drs. 6; Infusi Sennæ, ad fl. oz. 8. Mix. One sixth part once or twice a day. *In amenorrhœa with torpid action of the bowels.*

℞. Liquoris Strychniæ, min. 30; Tincturæ Ferri Perchloridi, fl. drs. 1½; Tincturæ Acteæ Racemosæ, fl. drs. 4; Infusi Quassiæ, ad fl. oz. 8. Mix. One sixth part three times a day.

℞. Podophylli Resinæ, gr. 6; Extracti Hyoscyami, gr. 24; Extracti Nucis Vomicæ, gr. 4; Pilulæ Aloes et Myrrhæ, gr. 30. Mix, and divide into twelve pills. One to be taken at bedtime for three or four nights in succession. *Where the menstrual flow is scanty, and the liver sluggish.*

423. *Medicated Vaginal Pessaries.*

℞. Plumbi Iododi, gr. 80; Extracti Belladonnæ, gr. 24—40; Extracti Conii, gr. 100; Olei Theobromæ, oz. 1—1½; Olei Olivæ, fl. drs. 2. Mix; melt into a mass with gentle heat, and pour it into a tube or roll of paper, about eight inches long and of the circumference of the little finger. Divide into eight pessaries; and order one to be introduced into the vagina every night, or every other night. *In chronic inflammation and induration of the labia uteri, in ovaritis, in pelvic cellulitis, and in chronic cystitis.* For an account of the advantages of cacao butter (oil of theobroma) over other materials in making these pessaries the reader is referred to a paper by the Author in the *Obstetrical Transactions*, vol. iv. p. 205, London, 1863.

℞. Unguenti Hydrargyri, gr. 80—150; Olei Theobromæ, oz. 1—1½; Olei Olivæ, fl. drs. 2. Mix. Divide into eight pessaries. Where there is tenderness of the cervix uteri, or of the ovaries, thirty grains of Extract of Belladonna or one hundred grains of Extract of Conium should be added to the mass.

℞. Iodoformi, gr. 80; Olei Theobromæ, oz. 1; Glycerini, fl. drs. 2; Mix. Divide into eight pessaries. *As a local anæsthetic in cancerous and other painful uterine diseases.* The smell of iodoform renders these pessaries very unpleasant to many patients.

℞. Extracti Aloes Socotrinæ, gr. 60; Olei Sabinæ, fl. drm. 1; Olei Theobromæ, oz. 1; Olei Olivæ, fl. drs. 2. Mix. Divide into eight pessaries, and order one to be introduced into the vagina every night. *As an emmenagogue and purgative.*

℞. Plumbi Acetatis, gr. 20; Extracti Opii, gr. 24; Olei Theobromæ, oz. 1; Glycerini, fl. drs. 2. Mix. Divide into eight pessaries, and order one to be used every night. *In chronic leucorrhœa, acute and follicular vaginitis, &c.*

℞. Zinci Oxidi, *vel* Bismuthi Carbonatis, gr. 80; Extracti Belladonnæ, gr. 40; Olei Theobromæ, oz. 1; Olei Olivæ, fl. drs. 2. Mix. Divide into eight pessaries. *In the same cases as the preceding. Also in cancer of the cervix uteri, and in severe irritability of the bladder.*

℞. Potassæ Permanganatis, gr. 24; Extracti Aconiti, gr. 12; Extracti Opii, gr. 16; Olei Theobromæ, oz. 1—1½. Mix. Divide into eight pessaries, and order one to be used every night. *In uterine diseases attended with pain and offensive discharges. In cancer advanced to the stage of ulceration the quantity of the permanganate should be reduced about one third.*

℞. Potassii Iodidi, gr. 40; Extracti Conii, gr. 120; Olei Theobromæ, oz. 1; Olei Olivæ, fl. drs. 2. Mix. Divide into eight pessaries. One to be used every night. *In induration of the labia uteri in strumous subjects.*

℞. Acidi Tannici, gr. 120; Pulveris Catechu, gr. 60; Olei Theobromæ, oz. 2; Glycerini Acidi Carbolici, fl. drs. 3. Mix. Divide into eight pessaries, and order one to be used twice a week. *In prolapsus uteri with relaxation of the vaginal tissues, as well as in uterine hæmorrhage, in chronic metritis, and in menorrhagia.*

424. *Medicated Uterine Pessaries.*

℞. Acidi Tannici, Olei Theobromæ, āā oz. ½. Mix. Divide into eight pessaries, each having the diameter of an ordinary stick of nitrate of silver. *In uterine hæmorrhage with a patulous condition of the os uteri, one of these pessaries may be introduced up the canal of the uterus and left there. It soon dissolves and coats the lining membrane with the tannin.*

℞. Aluminis, gr. 80; Zinci Sulphatis, gr. 40; Olei Theobromæ, oz. ½. Mix. Divide into eight pessaries, as in the preceding formula.

℞. Unguenti Hydrargyri, Olei Theobromæ, āā gr. 200; Extracti Belladonnæ, gr. 20. Mix, and divide into eight pessaries as in the first of these formulæ.

℞. Extracti Aconiti, gr. 12; Extracti Opii, gr. 16; Extracti Hyoscyami, gr. 100; Olei Theobromæ, oz. 1½; Olei Olivæ, fl. drs. 3. Mix. Divide into eight pessaries, and order one to be used every night.

425. *Vaginal Injections.*

℞. Extracti Hæmatoxyli, oz. 1; Aluminis, gr. 120; Aquæ, fl. oz. 2. Mix, and label,—"To be added to one pint of cold water to form an injection."—Like other vaginal injections this one is to be used with a vulcanized india-rubber syphon syringe, a pint or more of plain water being first thrown up.—*In diseases attended with an offensive discharge. The patient should be cautioned that the fluid will dye linen, &c., soiled with it.*

℞. Zinci Sulphatis, Aluminis Exsiccatæ, āā oz. 1; Acidi Tannici, oz. 2. Mix. Label,—"One teaspoonful to be mixed with a pint of tepid or cold water to form an Injection."—*In leucorrhœa, gonorrhœa, &c.*

℞. Zinci Chloridi, gr. 160; Aquæ, fl. oz. 3. Mix. Label,—"One teaspoonful to be mixed with a pint of cold water to form an Injection. To be used night and morning."—*In gonorrhœa.*

℞. Liquoris Plumbi Subacetatis, fl. oz. 6; Extracti Papaveris, oz. 2. Mix, and label,—"One large tablespoonful to be mixed with a pint of warm or tepid water to form an Injection."—*In cases of leucorrhœa, with an irritable condition of the os uteri or vagina; as well as in rodent ulcer of the uterus.*

℞. Extracti Papaveris, oz. 1½; Tincturæ Belladonnæ, fl. drs. 4. Mix, and label,—"Two teaspoonfuls to be added to one pint of linseed tea, to form an Injection."—*As a soothing remedy in cancer of the cervix uteri, when there is but little tendency to hæmorrhage.—It may be employed twice or thrice in the twenty four hours.*

426. *Sponge Tents, &c.*

For the purpose of dilating the mouth and cavity of the uterus, the female urethra, a strictured rectum, or a contracted orifice of the male prepuce, nothing can be better than the sponge tents introduced into obstetric practice by Sir James Simpson. These instruments are of a narrow conical form, and of various sizes. They are made by dipping a piece of sponge into water, and then compressing it around a central wire with whipcord. After drying, the cord is removed; the surface of the tent being then coated with a mixture of lard and wax, while three or four inches of tape are fastened to its base. The tents which the Author has generally used have been made by Duncan and Flockhart of Edinburgh, and they are perfect. A metallic director, somewhat resembling the uterine sound, with a sharp point, is needed for their introduction up the uterine canal; while their removal is accomplished by pulling the tape. A fresh tent must be introduced every twenty-four or forty-eight hours, until the tissues are sufficiently dilated to allow the finger to explore the cavity of the uterus.

Dr. Sloan of Ayr has suggested the use of the dried stem of the sea-tangle (Laminaria digitata) as a substitute for sponge. The stem of this common marine plant is cylindrical, soft, flexible, firm, and capable of being greatly reduced in size by drying. On subsequently being supplied with sufficient moisture it dilates to at least three or four times its size. The tangle tents produce equable dilatation, are in all respects very efficient, are cleanly, and ought to be cheap. They are more easily introduced into the uterus than the sponge tents, but they are also more liable to slip out again when the pressure of the finger is removed. In employing these tents it seems best to dip them in hot water just prior to introducing them; avoiding the use of oil, as it interferes with their absorbing power.

Tents may also be made of gentian and of elm bark; but the Author has had no experience with these kinds, having been perfectly satisfied with the sponge and sea-tangle.

427. *Galactophora and Galactophyga.*

a. Galactophora [Γάλα = milk + φέρω = to bear], or Galactagogues [Γάλα + ἄγω = to drive out], are remedies which increase the secretion of milk. Defective lactation is not common amongst healthy mothers, but with the weak and delicate it is very frequent. When it arises amongst the first class it is generally due to over-feeding; when amongst the second, anæmia is its cause. In either class, a torpid condition of the mammary gland may be its source.

Defective lactation from plethora will be best treated by purgatives, the most efficient being castor oil. All kinds of beer, wine, and spirits are to be prohibited. Animal food is to be allowed; with vegetables, bread, tea, &c. A mixture of milk and soda water, in equal parts, forms an excellent drink in these cases. The patient is not to be weakened; but she should be cautioned against the vulgar error, that a large quantity of food is necessary simply because she is nursing.

Defective lactation from anæmia is not uncommon. When the weakness is not such as to forbid suckling, the health ought to be improved by animal food; by a fair allowance of ale or porter or wine; and by taking milk, or cocoa made with milk, instead of tea and coffee. A raw egg beaten up in a tumblerful of milk, once or twice a day, will do good. Then ammonia and bark (F. 371) may be given; or some non-astringent ferruginous tonic (F. 403, 405); or cod liver oil.

Defective lactation from torpor of the mamma is the most frequent variety. In these cases benefit will be derived from irritating the gland and nipple,—as by the careful use of the breast pump; by drawing out the nipple several times with the fingers, before the infant is applied; by passing an electric current through the gland, for fifteen or twenty minutes daily, for several days in succession; or by the application of a hot carrot poultice, during some hours daily. The breasts are to be kept warm. Moderate sexual intercourse is also useful.—Beef and mutton, game and poultry, white fish, oysters, stewed eels, potatoes, parsnips, lettuce, carrots, turnips, &c., will increase the secretion. There is no objection to stout, or to any other kind of malt liquor, provided the stomach can digest it; while from one to two pints of cow's milk should be allowed daily.—With regard to drugs, perhaps the most efficacious is a decoction of the leaves and stalks of the *Ricinus communis,* or *Castor-oil plant.* Dr. Routh recommends the administration of a strong decoction of this plant or of an extract; the dose of the former being from one to two drachms daily in water, or of the latter five grains. The castor-oil leaves may also be applied over the breasts, or an infusion of them can be used with lint and oiled silk. Amongst other remedies reputed to possess galactagogue properties must be mentioned,—*Aqua Anethi* or *Dill water,* and *Oleum Anethi; Aqua Anisi* or *Aniseed water,* and *Oleum Anisi;* and particularly *Aqua Fœniculi* or *Fennel water,* and *Oleum Fœniculi.* The dose of either of these waters is from two to four ounces, and of the oils about five minims on a lump of sugar, twice or thrice daily.—The value of such agents as the *Malva Sylvestris* or *Marsh mallow,* of the *Saponaria vaccaria* or *cow basil,* of the juice or decoction of *Broom tops,* and of the infusion of *Althea root,* is very doubtful.

Sore nipples may indirectly be the cause of defective lactation. Slight excoriations, as well as chaps and fissures, can generally be healed by the use of the dilute solution of subacetate of lead, or by the liniment of lime, or by an ointment of balsam of Peru, or by a lotion containing borax and glycerine, or by the glycerine of starch. Frequently drying the nipple with a soft rag, and then dusting it with spermaceti which has been finely powdered by the aid of a few drops of proof spirit, will be found exceedingly efficacious. Where the fissures are deep, light cauterization with nitrate of silver often answers well; or the painful spots may be painted with collodium, leaving the summit of the nipple free for the escape of the milk. A well-made shield, provided with an artificial nipple, will often enable a woman to suckle when she would otherwise be unable to do so. The child's mouth must be looked to, so that if there are aphthæ they may be cured.

β. GALACTOPHYGA [*Γάλα*=milk+*φεύγω*=to shun] are the remedies employed to arrest the secretion of milk.

Extract of Belladonna, is I believe the most certain agent of this kind. Reduced to the consistence of treacle, by the addition of a little glycerine or water, it should be freely painted over each breast, night and morning, the parts being also covered with wet lint and oiled silk, or with a cold bread and water poultice. At the same time, one quarter or one third of a grain of the extract, may be administered twice or thrice daily, if a speedy effect be desirable. Sometimes it is advantageously given with quinine and camphor (F. 383).

Iodide of Potassium often succeeds, and is particularly useful if there be any painful engorgement of the glands. Six or nine grains daily, in divided doses, should be administered. Occasionally it may be better to give about ten minims of the tincture of belladonna with each dose; or the iodide can be combined with an active purgative salt, as the sulphate of magnesia (F. 31).

Colchicum has not succeeded well in the Author's hands when given alone. But combined with the sulphate of magnesia, in the proportion of twenty minims to sixty grains, administered two or three times a day, it has appeared serviceable.

Camphor has been recommended. Three or four grains, with the same quantity of henbane may be given in a couple of pills at bedtime; while frictions with the camphor liniment, or the compound camphor liniment, had better be employed twice or thrice daily.

Tobacco acts in a similar manner to belladonna. An ointment, made by boiling half an ounce of fresh tobacco in eight ounces of lard, is to be kept continually applied. Or this remedy may be employed in the form of a fomentation.

Sage tea is a popular remedy, which can certainly do no harm.

428. *Aphrodisiacs and Anaphrodisiacs.*

α. APHRODISIACS [*'Αφροδίσια*=venery] are medicines which excite or increase the sexual powers.

Many remedies have been supposed to act as sexual stimulants, but the majority of those which have been recommended merely have the property of exciting the imagination. This is especially the case with *Musk*, *Castoreum*, and *Ambergris*; extravagant substances which ladies may use as perfumes if they please, but which should be abolished from the Materia Medica. The volatile sulphurated or allyle oils, obtained from alliaceous and cruciferous plants (*Allium sativum*, *Allium cepa*, *Sinapis nigra*, *Cochlearia Armoracia*, *&c.*), have had some slight repute. *Indian hemp* and *Opium* have been used; but the latter, at least, generally exercises a contrary effect to that desired. *Cantharides*, *Turpentine*, and *Borax* probably possess no aphrodisiac powers, though popularly thought to do so. The only remedies which may truly be supposed to act as sexual stimulants are the various preparations of *Iron*, *Strychnia*, and *Nux Vomica*, *Quinine*, and *Phosphorus*.

β. ANAPHRODISIACS ['A=priv.+*ἀφροδίσια*=venery] are generally believed to have the power of repressing the sexual feelings.

Nauseants (*Tartarated Antimony* and *Ipecacuanha*), drastic purgatives (*Elaterium*, *Jalap*, *Calomel*, *&c.*), *Camphor* in large doses, *Carbonate of Soda*, *Hemlock*, *Tobacco*, and *Alcoholic drinks* probably possess anaphrodisiac properties.

XIX. ELECTRO THERAPEUTICS.

Three forms of Electricity are used in medicine—

1. That of *quantity:* produced by chemical action and obtained directly from a battery, regulated by the number and size of the cells, and called the Continuous, Voltaic, or Galvanic current—often erroneously termed the constant current.

2. That of *intensity:* produced by induction either from a magnet or a galvanic current, by long coils of insulated wire, and called the Induced, Faradic, or Interrupted current, or Magneto-electricity.

3. That of *highest intensity:* produced by friction on an electro-negative substance, and called Static, Franklinic, or Frictional electricity.

Galvanism, or the continuous current, is rarely applied without intermission, which is usually obtained by the rhythmical removal of one of the conductors from the skin. The intensity of a single cell of any form or chemical arrangement is quite insufficient to overcome the bad conducting power of the human body; therefore, when employing currents direct from the battery, many cells must be used, and as many as 50 or 60 should be contained in an apparatus intended for a variety of diseases.

Many forms of battery are now made, including the following :—

1. *Pulvermacher's* chains, which are portable and cheap, but are very uncertain in action, and soon lose their power.

2. *Froudé*, of Paris, lately exhibited to the Academy of Medicine a very portable form of battery—in fact, a modified voltaic pile; there has not yet been time to test its utility.

3. *Gaiffé's* contains 20—50 cells, which are closed ebonite cylinders, containing zinc and chloride of silver, in salt and water. The merits of this apparatus are portability and readiness for use. The great drawback is the difficulty of renewing the silver elements when worn out, which can only be done by experienced workmen. This battery, by the way, is "constant" as well as "continuous."

4. *Foveaux's* portable battery consists of 20—60 small Smee (zinc and platinized silver) pairs, in ebonite cells, which cells are raised by opening the containing box, thereby immersing the plates. The merits of this apparatus are its portability, neatness, and being easily managed, as it has a dial for arranging any number of cells in circuit at once.

5. *Mayer and Meltzer's* Galvano-Faradic apparatus has 20—30 carbo-zinc pairs in ebonite cells; an induction coil, which can be connected with any number of the elements in the battery; a galvanometer; and a commutator. With terminals, or binding screws, connecting the conductors with the battery, the primary or secondary coils, and good regulating arrangements, this forms a compact, portable, and useful instrument, the chief drawbacks being expensiveness and too small number of cells for voltaic practice among muscles, &c.

6. *Stöhrer's* continuous current batteries are made with 20—40 cells, zinc-carbon elements, in glass cells. The plates are hung from each side of a wooden element bearer (reaching the whole length of the battery), on the upper side of which slides a little apparatus with a commutator and binding screws, and the position of this "closing bolt" determines the number of cells in circuit.

Carbon is a favourite negative element, because it is equal to platinum as an electro-negative, is cheap and light, and may be made to displace a large amount of fluid in a cell, so that the level of the exciting liquid in a carbon battery is much lower when out of action (and carried about) than when in use.

7. The *Becker-Muirhead* battery is the best battery for consulting-room practice. It is a modification of the telegraph Daniell, and although its electromotor power is small, it is very constant in action. It is mounted in sets of 10 cells each, and 100 cells are required for a complete apparatus, which is of course a fixture. It requires careful attention every two or three months.

8. The *Leclanché* is more constant than the last, and will continue in working order for five years, a little water being occasionally added. Sixty cells are mounted in a battery for the continuous current, by Gaiffé; it is not very expensive.

The above-mentioned batteries have been considered simply as *medical* apparatus; Stöhrer's battery is useful also for electrolysis, the area of the plates being sufficient to produce a fair amount of chemical action, but not to injure the skin when used medically with sponge-conductors, as would be the case with larger negative plates.

For electrolysis, which is employed in medicine for the treatment of goitre, hydatids of the liver, and aortic aneurisms, batteries with larger cells are required, unless the operator has a battery with plates of ordinary size, capable of being coupled for quantity—*i.e.*, three or four of the zincs to be coupled together, three or four of the carbons to be coupled together, each *set* forming a positive or negative plate.

Of Induction Apparatus, the following forms will be found useful :—

1. *Stöhrer's* Faradic machine, *facile princeps* among medical induction coils. The secondary coil is wound on a bobbin, which slides over the primary coil, and thereby one means of regulating the force of the current is obtained. A tube can be made more or less to include the core of the primary, affording a second regulating power. The current break, or magnetic hammer, is a remarkably good one, and by it the rate of intermissions can be easily controlled; and a further means of graduating the strength of the apparatus is found in the mode of immersing the elements. Two kinds of Faradic machine are supplied, with one or two cells of the form of battery which is essentially Stöhrer's—viz., a cylinder of finely-grained carbon, bored in its upper two-thirds, to contain chromic acid, and closed by a glass stopper. The carbon is surrounded by a cylinder of zinc, at a small distance, so that the fluid resistance is lessened. A glass cell is used, the area of its horizontal section little exceeding that of the carbon, so that the dilute acid, when the elements are not immersed, occupies only the lower third or fourth of the cell, and is not likely to be spilt in transport. The rod which raises the glass cell, to set the apparatus in action, can be fixed at any height, and thus another means of regulation is afforded.

2. In power no medical coil is equal to that of *Duchenne*, the apostle of Faradism. The large Volta-Faradic instrument has various contrivances for regulating the force and direction of the primary and secondary currents, and the rapidity of their intermissions. The coil is horizontal, the primary and secondary each enclosed in a tube, whose position determines the current-strength, which is further affected by more or less withdrawing the core. The trembling hammer is a very good one, and a pedal rheotome is provided for slow interruptions. So far the apparatus is excellent, but the battery is far inferior to Stöhrer's, which only requires fresh acids after months of daily use, and is so easily thrown in and out of action. Under Duchenne's coil are drawers, each containing a carbon fixed in the bottom, on which, in charging, a layer of sulphate of mercury is spread, on this a piece of cloth, and on that the zinc. Each drawer thus charged is pushed into place, and the contacts are complete.

3. *Weiss and Son* make a battery in many respects resembling Stöhrer's.

4. Pocket induction apparatus is made by *Duchenne*, *Ruhmkorff*, and *Gaiffé*; each is useful. The latter makes one instrument in which the closed chloride of silver cells are used, so that it is always ready for use.

5. Most instrument makers supply the old form of Faradic apparatus, consisting of a coil (sometimes only the primary) excited by one or two Smee cells, and regulated by a column of water contained in a glass tube.

Magneto-electric machines are very much used, especially by patients themselves: readiness for use, ease of application, and absence of any fluid in their construction are their great advantages; the difficulty of graduating the strength is the drawback. This difficulty is surmounted in—

1. *Duchenne's* magneto-Faradic apparatus, which is the best and most elaborate of its kind. Force of current, rate of intermission, &c. are capable of most exact control.

2. *Gaiffé's* machine has coils on the magnet instead of the armature, and the distance of the magnet from the armature can be altered, and thus the force of the current controlled.

3. The *ordinary magnetic* machines sold by Maw and Son and other instrument makers, are valuable because they never get out of order: uterine hæmorrhage and asphyxia will not wait for repairs of apparatus.

For *Franklinism*, or *Static Electricity*, it is customary to use a Cuthbertson or Holtz machine, with Leyden jars and Electrometer; a glass-legged stool, or large piece of thick gutta percha or rubber matting, is needed fully to insulate the patient.

Frictional, or Static Electricity, at one time the only form of this agent known, has been limited in its medical application of late years to few diseases. But a revival of its use is likely to follow a general reception of Dr. RADCLIFFE'S theory, that animal electricity is naturally in the state of a positive charge. ("Dynamics of Nerve and Muscle." Macmillan, 1871.)

To retain the normal irritability of nerves and muscles, it is sometimes necessary to supply their sheaths with positive electricity, which may be done either by the frictional machine or by the continuous current. In the latter case it is necessary to connect the positive pole of the battery with the earth, by means of a wire to the chandelier (thereby conveying the negative electricity to the immense earth-plate of the underground gaseous circulation), and then the electrodes being well insulated, place the patient and the battery on a thick gutta percha mat, and any part of the body can be made to receive a positive charge, for the preservation or restoration of its irritability. This treatment is recommended by Dr. TIBBITS, in spasm of the facial muscles resulting from Faradism, in hysterical contractions, in some cases of wasting palsy, and in the excitable state of the cord which sometimes follows myelitis.

A form of treatment called *General Electrization*, has been introduced by Drs. BEARD and ROCKWELL (New York, 1871), on the principle that "Electrization, besides being a local stimulant, exercises an influence over general and local nutrition entitling it to the highest rank among constitutional tonics." This is new ground for electrical practice. The American practitioners generally appear to combine much rubbing and shampooing of the surface with their Faradism and Voltaism. The method under consideration consists in placing the patient with his feet naked upon a sheet of copper connected with one pole, while the other pole is connected by a moistened sponge with the left hand of the operator, who passes his disengaged hand over the muscles of the patient, and sometimes over the whole body. (TIBBITS.)

The usual methods of applying electricity are *direct and indirect localized* electrization. In the former the rheophores, or current-bearers, are placed directly upon the organ, a muscle usually, to be Faradized or Galvanized. (If the latter, one of the rheophores must be removed and replaced on the skin at regular intervals.) And in some cases it is well to moisten the sponges of the moist rheophores with salt and water; this solution, being a better conductor than water alone, facilitates in a greater degree the passage of the current to the deeper parts.

In *indirect electrization*, two points in the course of a nerve are selected for the rheophores, and the current is thus made to affect the part supplied by the nerve.

The *conducting cords* used for connecting the battery or coil with the rheophores, or current-bearers, are made of various materials—usually a strand of fine copper wire covered with some insulating material; the best thing for the purpose is a single copper wire, coated with one layer of gutta percha; it is cheap, easily procured, and easily attached to instruments.

The *rheophores*, or *electrodes*, should have insulating handles of glass, ebonite, ebony, or varnished wood, and if for sponges, the metal cups should be short and broad, instead of being long narrow tubes such as are often supplied.

Other moist rheophores are made with disks of brass, metal olive-shaped tips, or globes of brass, to be covered with wash-leather and used wet. As above mentioned, this moisture increases the conductility of the skin, and is needed when it is desired to reach the deeper parts. For the skin itself a dry conductor—as a wire brush or the operator's hand—is to be preferred. Special conductors are needed for the larynx, urethra, bladder, rectum, uterus, &c.

General Instructions.—All parts of electrical apparatus require to be clean, and the points of contact, binding screws especially, to be kept very clean and bright.

DR. POORE, in his lectures (*Lancet*, May, 1874) advises that a medical man should take his instruments to pieces, in order fully to understand their principles and working. It is an excellent suggestion.

The currents from the primary and secondary coils are not materially different in function, except in so far as their degrees of tension are concerned; and the poles do not differ, so that their relative position is unimportant.

Great caution is necessary, more especially with the continuous current, in applying electricity to the spinal cord or brain ; and before electrizing any part of the body, it is well to place the electrodes on some analogous part of the operator's surface. Nevertheless, the effect of a current differs greatly, as there is idiosyncrasy with respect to this as to other remedial measures.

DUCHENNE and others lay great stress upon Faradizing every bit of a muscle, either with a rheophore of large surface, or by carrying the sponge over its whole extent. The olivary conductors are useful for small muscles, as the interrossei and facial muscles.

The *differences* in action of the *continuous* and *induced* currents are due to—

(1.) The higher tension of the induced current, which enables it to overcome great resistances, and reach deep muscles and nerves.

(2.) The greater quantity of the continuous current gives it more chemical power ; the Faradic current, as well as the continuous, decidedly affects nutrition by its action on the smaller arteries, and by inducing movements which produce tissue changes. (DUCHENNE.)

(3.) The direction of the continuous current is uniform, the induced current changes constantly, and

(4.) The continuous current flows in a regular stream as long as contact is maintained, the induced current lasts for a small fraction of a second. Partly due to this, probably, is due the fact pointed out by M. CYON, and more recently by DR. POORE, that a continuous current passing through a group of healthy muscles enables them to make unusually strong and protracted action. (*Practitioner*, Jan. 1873).

Electricity in Diagnosis.—The main point on which the value of electricity in determining the locality and nature of disease depends, is the behaviour of muscles with the Faradic and Voltaic currents.

The apparatus of each kind should be reliable in operation, and capable of having its strength easily controlled. Begin by placing the conductors of a moderately strong Faradic current, on a muscle of the sound side, and decrease the strength until the point is reached at which contraction can only just be excited. The next step is to examine in the same manner the contractility of the diseased side. Next compare the results of Faradizing the healthy and diseased sides by passing the current through the nerve trunk supplying the muscle before examined. When the galvanic or continuous current is used in this way, care must be taken in every trial to place the positive conductor nearest the centres, and to make the interruptions at the same rate in each case.

In *hemiplegia*, early in the disease, the Voltaic and the Faradic contractility will be found to be normal—if increased, there is central disease progressing, as in inflammatory softening, and electric treatment is contra-indicated. As time goes on, the paralysed muscles usually lose their contractility by degrees.

In *paraplegia*, due to disease of a segment of the cord only, which cuts off the part of the cord below the damaged point from the brain, but leaves the paralysed muscles in relation with healthy cord, the condition of the paralysed muscles will be similar to that found in hemiplegia ; Voltaic and Faradic contractility will be normal till impaired by long disuse, but there will in addition be excessive reflex action.

If the *paraplegia* is due to disease of the entire portion of the cord corresponding to the paralysed parts, we have the condition sometimes called *Spinal Paralysis* in which there is lessened contractility, Voltaic and Faradic. This condition is also present in muscles supplied by the nerves which arise from a diseased segment of the cord.

In *peripheral paralysis*, due to disease in the course of a nerve cutting off the muscles from the nerve cells of the spinal cord, or to an affection of the peripheric extremities of the nerves, the muscles contract with the Voltaic, but not so well, or not at all, with the Faradic current.

In *lead paralysis*, the reaction with Faradism fails before the will has lost its control, but the Voltaic current acts with increased strength at this period, and the contractility remains after the voluntary power of moving the muscles is gone, and when atrophy has commenced.

In *infantile paralysis*, due probably to an affection of the periphery of the nerves, the loss of Faradic contractility is very sudden, and is usually complete in about four days (Barwell). A Voltaic current, of great strength, will also fail, after the disease has lasted some time, to produce any effect; but it should be applied to the part affected a few times, and will usually restore the contractility. (See "Barwell's Lectures," *Lancet*, 1872-3.)

In *rheumatic* and in *hysterical paralysis* contractility is usually normal, but in the latter the muscular sensation is nearly lost.

In *progressive muscular atrophy*, any muscular fibres which remain retain their electrical susceptibility; diminished electrical reaction follows, and denotes the gradual destruction of the muscles.

In the recognition of *feigned disease*, much assistance may be obtained from a powerful induction apparatus.

DISEASES IN WHICH ELECTRICITY IS OF VALUE.

In *cerebral disease* Faradism is never to be used to the head. The continuous current from 5—10 cells may be applied axially by placing one electrode on the lower part of the spine, and the other at the back of the head; or transversely, by placing one conductor on each temple, or one on the forehead and the other on the occiput: and slow intermissions are to be made.

Melancholia, with stupor and refusal of food, in two cases under the care of Dr. Williams, of Hayward's Heath Asylum, yielded at once to the use of a 40-celled Stöhrer's battery, and after a few daily applications both patients recovered. The number of cells here employed must be considered as exceptional. (*Lancet*, 25th Jan. 1873.)

In *softening*, *nervous exhaustion*, and *epilepsy* the continuous current has been of use. In the latter disease, Dr. Althaus recommends the negative conductor to be placed on the seat of the "aura," and the positive on the mastoid process.

In *hemiplegia* and *paralysis of cerebral origin* generally, no good can be done by muscular electrization soon after the attack, as a certain degree of irritability remains; and violent muscular tremors, to say the least, may result from Faradization.

Dr. Tibbits says that four to six months should elapse before treatment of the muscles begins, and he gives some useful directions for managing "late rigidity." The chief points are Voltaism of the rigid muscles, and Faradism of their opponents.

When the proper time for treatment of the paralysed muscles has arrived, Faradize the whole of the surface of the organs affected, passing one of the conductors over every part of the muscles: the application should last from 5—15 minutes and be repeated daily or every other day.

The end to be attained by Faradization in hemiplegia, or other forms of cerebral paralysis, is to maintain or restore the conductility of the nerves and the contractility of the muscles of the paralysed regions which are liable to be impaired by prolonged disuse, so that as the nerve-centre recovers its function a path may be open for the first feeble impulses it is capable of issuing. When therefore, after a proper interval, the reaction of the muscles to electrical stimulation, direct and indirect, is normal, and the paralysis still persists, further electrical treatment will be useless, as the cause is to be found in the character of the lesion of the nervous centre.

The nutrition of paralysed parts may be improved, as well as contractility restored, through the action of the current on the muscular walls of the bloodvessels.

Diseases of the spinal cord.—Tumours, severe injuries, sclerosis or softening of the cord, are not likely to be benefited by electrical treatment; but paralysis resulting from slight meningitis, or myelitis, anæmia, or exhaustion, will probably derive benefit from a Voltaic (15—30 cells) current applied by electrodes placed over the nucha and lower part of the back. Begin with few cells and increase the number as may be indicated. The results of syphilitic disease are amenable to electricity when the morbid process has been arrested, and the exudation removed, by iodide of potassium. Electrical attention is to be directed to the peripheral expressions of disease.

Galvanization of the cervical sympathetic, of which so much has been said, is recommended by Meyer in irregularities of temperature, heat in the skin of the head or face, coldness of extremities, &c., and in primary arterial spasm, apoplectic paralysis, progressive muscular atrophy, and neuralgias and spasms of the cerebro-spinal nerves, and he gives illustrative cases. Benedikt also advocates this mode of treatment for intracranial diseases. From ten to twenty cells are to be used. The electrodes are small sponges, the positive pressed deeply into the fossa under the ear, while the negative is placed either on the sixth cervical spine, or over the sternal origin of the sterno-mastoid muscle. The application must be at once stopped if giddiness or sickness appears.

In *hysterical paralysis*, galvanize the spine, and Faradize the parts affected with a wire brush; a sponge electrode being placed over the spinal origin of their nervous supply.

Lead paralysis is treated by directly Faradizing the affected muscles, if they respond; but if not, a strong Voltaic current should be used—say 40—60 cells—attacking every part of the muscles, and using slow intermissions. When the Faradic contractility returns—as is usually the case after a few applications of the battery current—Faradism and Voltaism are to be employed alternately. Medical treatment must be continued at the same time.

Peripheral paralysis, dependent on a wound of a nerve, will not be successful until the nerve wound is healed. In paralysis dependent on rheumatism, cold, or pressure, the induced current must be employed.

The treatment of *facial palsy* should begin early if it is of local origin or from cold, and very often the continuous current will be needed to produce muscular action. To produce an equable result, the treatment should be directed to each muscle affected, especially when using Faradism. (TIBBITS.) When the affection arises from locomotor ataxy, or cranial disease, Voltaism only should be employed.

Paralysis of the Ophthalmic Muscles.—Put one conductor under the ear, or let the patient hold it in his hand, and let a small electrode rest as near the muscle as possible, beginning with a weak Faradic current.

Paralysis of the Laryngeal Muscles.—Three methods of electrical treatment are applicable to these affections :—1. A gum elastic, metal-tipped conductor is to be passed down the pharynx, touching the back of the larynx, the second electrode being a wire brush applied to the front of the neck over the cricoid cartilage. Faradism is to be employed. Or 2. A proper laryngeal rheophore is passed with the aid of the mirror into the larynx itself; the second electrode being a sponge on the front of the neck or elsewhere. 3. Electrization by sparks from a frictional machine has been of great use in emotional aphonia.

Glosso-labio laryngeal Paralysis.—The Faradic current should be applied by means of one pole placed on the nape of the neck; and the other to the inside of the lips, the tongue, and front of the neck.

Paralysis of the bladder requires Faradism by means of a peculiar electrode, consisting of a catheter, with a metal tip, the halves of which can be made to diverge after it is placed in the bladder; otherwise an electrode, shaped like a catheter, with a metal point, must be used, the second being the rectal rheophore in the rectum. The bladder should be empty.

Constipation, when dependent on muscular inertia, or disease of the spinal cord, may be relieved by a Faradic current, employed by means of a special conductor for the rectum, and a sponge applied to the abdomen or over the sacrum.

Impotency may arise from want of erectile power in the penis, in which case apply the Faradic current to the organ with a wire brush or sponge electrode. When the condition is due to deficiency of semen, apply Faradism by moist conductors to each side of each of the testes. Seminal emissions are in some cases restrained, or even checked, by applying the current from 10—15 cells to the verumontanum by one electrode, the second being placed on the perinæum, three times a week.

Progressive muscular atrophy has been successfully treated in many cases by Meyer and Duchenne, by Faradizing the sets of muscles as they are attacked, and galvanizing the nerve trunks of the parts affected.

In *locomotor ataxy*, Faradization is employed for the diplopia, and applied to the skin relieves the muscular pains. Benedikt and Onimus have galvanized the spine with benefit to some cases.

Chorea is best treated electrically by the continuous current: the positive conductor is placed over the muscles affected, the negative to the nerve supplying them; or the current may be passed from the affected parts to the upper part of the cord, the negative conductor being placed on the back of the neck. Three cases treated by the writer in the latter mode, sometimes Faradically and sometimes by the continuous current, made a good recovery, iron being given at times in one case, and sulphate of zinc in another; but most improvement was made after the medicine was discontinued.

DR. ALTHAUS recommends the alternate use of Faradism and Voltaism.

Writer's Cramp.—In this disease, as in *torticollis* and *contraction of the splenius*, it is advisable to Faradize muscles antagonistic to the affected ones. If there is tremor, "the positive charge" should be applied.

Shaking Palsy, in recent cases, is to be subjected to the positive charge.

Tetanus.—Apply a current from 8—10 Daniells, the negative pole being placed on the spine, the positive on the tetanic muscles.

DISEASES OF WOMEN.—*Amenorrhœa* is often successfully treated by Faradizing, or still better, galvanizing the uterus; one electrode being placed on the abdomen, and the other, either a sponge holder on the lumbar spines, or a rectal rheophore passed up to the cervix uteri. The former is preferable, and according to ALTHAUS just as good.

Menorrhagia is relieved by Faradization applied in the same mode, or passed from hip to hip, and from sacrum to pubis.

Uterine inertia.—The Faradic current may, in some cases, take the place of, or assist ergot of rye. A proper uterine rheophore is passed up to the cervix uteri, and a moist sponge is placed on the abdomen. A rheophore shaped like a long spoon, the bowl filled with soft sponge, and the handle made of insulating material, is very convenient for apply currents to the abdomen. Moisten the sponge with *hot* water.

In a case of accidental hæmorrhage in a flabby multipara, the Faradic current produced immediate expulsion of the child and placenta, shortly followed by a very large clot.

Faradism of the *breasts* will often increase or restore the secretion.

RELIEF OF PAIN.—*Neuralgia* often yields at once, sometimes permanently, to the Faradic current. Meyer applies it curatively as the "Electric Moxa," or a wire-brush electrode held in one spot, and a very strong current. Voltaism is most successful in this disease, however, and is applied with the negative pole, a moist sponge on the point of origin of the nerve affected, and another sponge electrode for the positive, placed on the painful spot, the time being determined by the amount of action on the skin, as it is undesirable to cause any soreness. Five to ten cells of a battery in good order will usually be enough for the face; ten to thirty for other parts of the body. A little moral influence may be useful in the treatment, as neuralgic patients are given to variety, and often abandon a remedial measure if not at once successful, before it has had a fair trial.

Sciatica requires the application of a Voltaic current from 10—30 cells; the negative on the lower dorsal spinous processes; the positive on the lower part of the thigh or leg.

Sick-headache.—A continuous current, beginning with 5 cells, is used, the electrodes being placed on the mastoid processes.

Rheumatic pains in the muscles are relieved by Faradizing the dry skin with a brush or dry plate.

HYSTERICAL ANÆSTHESIA.—The best application is daily Faradization of the affected parts with a wire brush, the strength of the current to be increased to the utmost bearable limit. And while increasing the power of a Faradic apparatus, it is well to keep the electrodes applied, always supposing that the operator is acquainted with the energies of his instrument.

DEAFNESS.—Electricity, in the form of a slowly interrupted Faradic current, has done much good to old cases of nervous deafness. The meatus is filled with water, an electrode, insulated except at the tip, is passed in, and the other electrode is placed on the neck. The current must be weakened or discontinued if it cause giddiness.

ASPHYXIA.—Use electrodes with button-like metal tips, covered with wash-leather or sponge, and a Faradic current sufficient to cause contraction of the muscles of the ball of the thumb. Place one conductor on each side of the neck, outside the sternomastoid in its lower half, as in this place it will affect the phrenic nerve, the sternomastoid and the scaleni muscles; let the pressure last the length of an inspiration, then assist expiration by pressure on the abdomen. The strength of the current at first failing to excite contraction, increase it to the full power of the apparatus, and *that* failing, use Voltaism in the same manner. A double electrode would be advantageous, conveying the current to the two sides of the neck from one pole of the instrument, while the other pole is applied to the epigastrium or seventh intercostal space.

AORTIC ANEURISMS have in some cases been successfully treated by a current from a few cells of medium size. Various methods have been recommended. Needles insulated to within a short distance of the point are passed into the sac; according to some experimenters they should be connected with both poles of the battery, according to others with the negative pole only, the positive rheophore being a wet sponge placed on the skin near the aneurism; according to others again, the needle should be in relation with the positive pole. The object sought is the obliteration of the aneurism by the coagulation of the blood which takes place round the needle when the current is passing; the coagulum round the negative pole is large and loose, that round the positive small but more firm; it is not yet definitely known which best answers the purpose required. The current must be passed for some hours. Great pain is often excited.

VASCULAR NÆVI are treated with remarkable success by inserting needles into the tumour, which are connected with the negative pole of the battery, the positive being formed by a wet sponge.

HYDATIDS OF THE LIVER.—The current from ten cells was employed at Guy's Hospital, in some cases of hydatid cyst, and in eight instances proved very successful. Two needles from the negative pole were introduced into the tumour, and a moist conductor from the positive was applied to the skin of the abdomen. (*Med. Chir. Trans.* London, 1871.)

For the practical use of electricity in medicine, see Tibbit's "Medical Electricity." (London, 1873.) For diagnosis, and for the application of the continuous current, see Meyer's "Electricity in Pract. Medicine," translated by Dr. Hammond. (New York, 1869.) For apparatus, see Duchenne's "Localized Electrization," Part I., translated by Dr. Tibbits, London. For a comprehensive treatise on the whole subject, see Dr. Althaus's "Medical Electricity." (New edition. London. 1874.)

XX. CLIMATES FOR INVALIDS.

429. *General Observations.*

Notwithstanding the excellent writings of SIR JAMES CLARK, EDWIN LEE, GRANVILLE, BURGESS, ALEXANDER TAYLOR, D. J. T. FRANCIS, SCORESBY-JACKSON, and others, many invalids migrate every autumn to the south of France, Italy, Spain, &c., merely to find a grave. This happens partly because cases of far advanced disease are still sent abroad, when they ought to be kept at home; partly, because a situation unfavourable to the particular malady is selected, the laws of climate being ill-understood; and, in some measure, because it is difficult to persuade the sick that simple change to another country is only one of the means by which they are to regain health. For although there can be no doubt that in change of air physicians have an efficient remedial agent, yet it is certain that this remedy, like all others, is not of indiscriminate application, but must be prescribed with judgment and discretion.

The diseases most likely to be cured or alleviated by the benign influence of change of climate are the following:—Pulmonary consumption; chronic laryngeal and bronchial affections; asthma; disorders of the digestive organs, with the various forms of dyspepsia; chronic gout and rheumatism, functional derangements of the sexual organs; affections of the kidneys; obstinate neuralgia; and hypochondriasis. A change is beneficial to strumous delicate children; is invaluable as a restorative during convalescence from acute or prolonged disease; and especially is it one of the chief resources of "preventive medicine." In incurable disease a visit to another part of the sufferer's country, or to some foreign station, will now and then serve to ward off complications, to give mental exhilaration, to promote appetite and digestion, and to be the source of tranquil nights.

There is no model climate: no country can boast of being perfect. Doubtless in some of the new towns about California remarkable climates are found. The luxuries on the Pacific side of North America are unknown to Europeans. Speaking of small towns near Placerville, Sir Wentworth Dilke says (Greater Britain, 156), that except in the far interior or on the hills, "one even spring reigns unchangeably; every fruit and vegetable of the world is perpetually in season." All that the physician's knowledge and tact will enable him to do is to select that situation which possesses the greatest advantages and the fewest drawbacks for the particular case he has in hand. Phthisis, for example, is prevalent and fatal in all countries, though more so in some than others. Moreover, it must be remembered, that through the peculiar nature of zymotic [ζυμόω = to ferment] diseases, towns usually healthy are apt to be periodically visited by epidemics; and such places can only be avoided by consulting recent returns, or by instituting inquiries on the spot. In considering the sanative influence of any climate, our chief object must be to learn on how many days during the winter and spring months it may be expected that the invalid will be confined to the house by bad weather. If the number be at all large, he can just as well remain at home. To decide the point, the nature of the sick man's disease, and constitutional strength must first be determined. Then as regards any given locality attention must be paid to its aspect, its drainage, and its elevation above the sea level; to the temperature and its equability; to the dryness or moisture of the soil and atmosphere, a degree of heat being often well borne when the air is dry, which is quite unbearable when it is moist; and to the nature of the prevalent winds. The amount of rain which descends in a season is not of such moment as the way in which it usually falls; a region liable to sharp heavy showers being much more favourable for the invalid, than one where it drizzles—like a Scotch mist—for days together. Luxuriant vegetation, though agreeable to the senses, may merely mean high temperature combined with moisture; conditions not favourable for the phthisical. So also the districts where marshy lands abound, or where occasional inundations occur, are notoriously unhealthy; for the evaporation of the water lowers the temperature, while the decaying vegetable matter becomes the source of malaria.

The beneficial effects of sea air are due to its purity, to the equability of its temperature, to the iodine it contains, and to the constant presence of ozone. The latter—the most powerful oxidizing agent known—is a stimulant to all the vital functions; but if in excess it causes great irritation, particularly of the organs of respiration. Ozone, found also in the air of mountainous and rural districts, has the property of decomposing iodide of potassium, uniting with the potassium and liberating the iodine, which latter body may be detected by starch. Hence, test-papers saturated with a solution of iodide of potassium and starch are employed; the iodine, when freed by the ozone, uniting with the starch and forming blue iodide of starch. (See F. 389).—While sea air by its invigorating and other properties has a certain amount of influence in preventing tuberculosis, it is by itself insufficient to cure this disorder Mountain air is also pure, has an average low temperature, and contains a large proportion of ozone. There is a diminution of atmospheric pressure, but more wind and moisture at high elevations. Speaking generally, mountain air is tonic and bracing: it improves the appetite, lessens anæmia, and especially promotes a healthy action of the abdominal viscera.

Although a classification of climates can only be artificial, and merely useful as affording a rough view of their nature, yet those countries mostly resorted to by invalids may be arranged in four divisions, viz. the relaxing, sedative, exciting, and bracing.

1. In the *relaxing* climates (*e. g.* Pisa, Madeira. Torquay) there is an elevated temperature with an excess of communicable humidity. They are unfitted for cases where we wish to restore diminished tone to build up shattered constitutions; as well as for subjects with a tendency to hæmorrhage.
2. In the *sedative* climates (Rome, Pau, Cannes, Venice) we find a freedom from great dryness on the one hand, and from communicable humidity on the other. We should not select these where it is desirable to quicken a slow circulation, or where the secretions are too abundant.
3. In the *exciting* climates (Nice, Naples, Montpellier, Florence, Genoa, &c.)

there is an excess of dryness, a highly electric state of the air, an excess of ozone, and during the early months of the year keen irritating winds. Such climates are injurious where there is nervous and vascular excitement, a tendency to inflammation, or where functional repose is needed.

4. In the *bracing* climates (Southport, Brighton, Mentone, Malaga, Algiers, &c.) the winter temperature while comparatively high is not oppressive, the air contains a moderate proportion of ozone, there is a certain amount of dryness, and the winds are less irritating than in the exciting class. They are generally to be avoided where there is a very sensitive state of the system, a tendency to apoplexy from hyperæmia, and in many affections of the heart or large vessels. But, as a general rule, they are more suited to cases of pulmonary consumption, and to renal and hepatic diseases than either of the others.

It would be of little practical use to introduce an extended table giving an approximation to the death rate of different countries. But it is interesting to shortly notice, that on an average of ten years (1851—60), the annual mortality from all causes, stands thus :—

For	England and Wales,	population in	1861	being	20,066,224,	the deaths are	20	to each 1000	persons living.
,,	London	,,		,,	2,803,988,	,,	24	,,	,,
,,	Bristol..................	,,		,,	66,027,	,,	27	,,	,,
,,	Birmingham	,,		,,	212,621,	,,	27	,,	,,
,,	Manchester	,,		,,	243,988,	,,	31	,,	,,
,,	Liverpool	,,		,,	269,742,	,,	33	,,	,,
,,	Dover	,,		,,	31,575,	,,	20	,,	,,
,,	Hastings...............	,,		,,	26,631,	,,	18	,,	,,
,,	Eastbourne............	,,		,,	10,721,	,,	17	,,	,,
,,	Brighton...............	,,		,,	77,693,	,,	22	,,	,,
,,	Worthing	,,		,,	18,921,	,,	18	,,	,,
,,	Isle of Wight.........	,,		,,	55,362,	,,	17	,,	,,
,,	Scarborough	,,		,,	30,425,	,,	21	,,	,,
For	Paris..............	population in	1862	numbering	1,696,141,	the deaths are	28	to each 1000	persons living.
,,	Berlin	,,	1861	,,	547,571,	,,	25	,,	,,
,,	Vienna............	,,	1861	,,	512,000,	,,	49	,,	,,
,,	Turin	,,	1858	,,	179,635,	,,	26	,,	,,
,,	St. Petersburg	,,	1858	,,	520,131,	,,	41	,,	,,
,,	Moscow	,,	1858	,,	386,370,	,,	38	,,	,,

When the locality to which an invalid is to resort has been decided upon, he should, on leaving home, be provided with a concise code of laws in writing; or he must be directed at once to consult a physician in practice at the town selected. His route had better be marked out for him; he should be cautioned as to the rate at which he is to travel; rules must be laid down as to the regimen he is to adopt; while he ought to be reminded that warm clothing, especially flannel, will be required. Frequently it will be better to have cheerful apartments, with a southern aspect, secured beforehand; so that at the end of his journey a few days' perfect rest may be enjoyed. The object of the tour ought to be clearly explained, while he is to be warned not to expect too much, especially at first. The physician in sending his patient abroad, is merely placing him in the position most favourable to recovery,—but still where other remedies and general precautions will be indispensable. Foreign travel would be more agreeable to most men, could the plague of sightseeing be dispensed with. But for the sick man to visit picture galleries, museums, damp old ruins, cold churches, &c., is frequently to frustrate the only object he should have in view, viz. the restoration of his health. In giving directions as to diet it must be recollected that travelling is very exciting and wearying to the invalid; that the organs of digestion almost always become more or less deranged; and that many articles of food which are taken with advantage in England, disagree in warmer latitudes.

The best time for leaving England is between the end of September and the middle of Octoter. The patient with pulmonary disease ought not to return until May. In many instances the Author has found it advantageous for the invalid intending to stay away from home for several months to carry with him a few pure drugs; together with a brief account of their properties, doses, and modes of combination. Not that he is to be encouraged to tamper with his health by playing the dangerous part of the amateur physician; but good advice cannot always be procured, or it may perhaps be had where only inferior drugs are obtainable for compounding the prescription. The medicines which are generally ordered are these :—

Sulphate of Quinia, 1 oz.
Reduced Iron, 1 oz.
Liquid Extract of Yellow Cinchona, 4 fl. oz.
Spirit of Ether, 6 fl. oz.
Liquid Extract of Opium, 2 fl. oz.
Sulphate of Zinc (for emetics, lotions, collyria, &c.), 3 oz.
Chloroform, 2 fl. oz.
Bicarbonate of Soda, 4 oz.
Compound Powder of Rhubarb, 6 oz.
Aromatic Powder of Chalk and Opium, 3 oz.
Tincture of Arnica (for bruises, burns, &c.), 2 fl. oz.
Morphia & Ipecacuan Lozenges, ¼ to 1lb.

Scales and weights : an ounce and a minim measure : a small spatula : an enema syringe, the cheaper and more simple the better: with lint and strapping, will complete the medical equipment. In certain special cases it may be well to substitute for some of the above drugs—blue pill, iodide of potassium, colchicum, gallic acid, tincture of digitalis, pepsine prepared from the pig's stomach, and oil of peppermint. Two invaluable medicines—brandy and cod liver oil—can be procured everywhere. An air cushion often proves serviceable.

La Poudre Insecticide is sold in France, and is a very efficacious remedy against fleas. One or two teaspoonfuls, sprinkled over the sheets, serve to destroy these foes to comfort and sleep. Persian Powder, made with the leaves of a kind of groundsell, will have a similar effect ; and so will camphor, though in a less degree. Mosquito curtains may also be taken from England ; for mosquitos are a serious nuisance to all, but especially to the invalid, and they continue venomous in the south until the cold nights set in.

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430. *Middlesex.*

London.—This city, the largest and most healthy in the world, is bounded by moderate hills ; has a soil of loam and gravel, with clay resting on a bed of chalk ; and is some fifty miles from the sea to the south and east. In 1861 the area of London was 122 square miles,—giving about 23,000 persons to a square mile of surface. The mean annual temperature is about 50° Fahr. : the average winter temperature being 38°, and that of the summer 63°. The nights especially are warmer than in the environs. The annual rainfall is 21·6 inches: the average number of days, more or less wet, being 178. Formerly certain springs in the neighbourhood of this city were used for medical purposes. Thus there were chalybeate springs at Hampstead and Sadler's Wells : aperient waters at the Beulah Spa, Kilburn, and Streatham. The aperient salt, as at Epsom, was sulphate of magnesia.

Delicate individuals are often better in London during the winter and spring, than in the country, owing to its greater warmth, and the greater steadiness of the temperature from day to day.—Asthma is such a precarious disease, that it is impossible to say beforehand what particular climate will suit any special example of it. But it is certain that very many asthmatics are better and more free from attacks in a large city, than in the clearer atmosphere of the country. Sufferers from this affection can especially apply to themselves the words of Bacon,—"The goodness of the air is better known by experience than by signs."—Phthisical invalids will find Brompton or Chelsea the most sheltered spots of the metropolis ; but if they are benefited by a bracing air they must resort to Bayswater or Highbury, or the upper part of Kentish Town, or to Highgate.

Hampstead.—Many years ago, a mineral spring of repute in this village rendered it a fashionable watering place. It is still a healthy suburb. From the heath, upwards of 200 acres in extent, there are many fine views. The air is pure and bracing, and well suited for children and convalescents. The low parts are damp and should be avoided.—Like Greenwich, Richmond, Lewisham, Dulwich, Sydenham, &c., Hampstead often affords a convenient temporary residence for families driven from their town homes by the outbreak of some eruptive fever or other infectious disease.

431. *Kent.*

MARGATE.—The tonic and bracing air of this familiar locality renders it a very valuable temporary residence for many invalids. The atmosphere is extremely pure, the soil is dry and absorbent, and the water supply good. Perhaps no place could be named which is more suitable for restoring the health of children and young people afflicted with any form of scrofula. In strumous diseases of the joints, the most marked improvement usually results from a few months' stay at this town. The bathing is good; though the flatness of the sands may be a disadvantage to the adult.

The mortality among the residents is very low. For a long series of years (1838 to 1862) the average annual death rate has been only 16 per 1000 for this class. The season lasts from the middle of May until the end of September. Being open to the north and east, the air is very bleak during the late winter and early spring months.

RAMSGATE.—Is much frequented in the summer owing to its gaiety, facilities for sea-bathing, &c. It is an excellent residence for delicate children during the months of October and November, when the crowds of visitors have left. The climate is warmer than that of Margate, and more bracing than that of the south coast watering-places. BROADSTAIRS is situated in a pretty little bay about three miles from Ramsgate, and affords a very healthy and quiet sea-bathing place for children. The air is much less bracing than that of Margate.

DOVER.—This sheltered town is generally full in the summer and autumn. As a winter residence it is colder and more exposed to high winds than Hastings, but it is not therefore unsuitable for invalids who can bear a bracing air. In January the weather is often fine and invigorating, but decidedly cold. The easterly winds which prevail during March are very trying. May and June are very agreeable months, as are August and September and October. The climate proves especially serviceable to those subject to strumous affections, chronic bronchitis, dyspepsia, nervous debility, congestion of the liver, &c.

FOLKESTONE.—The beautiful country in the neighbourhood, and the fine tonic air of this town, render it a most agreeable residence from the end of May until the beginning of November. Sufferers from dyspepsia, nervous irritability, and overwork will derive most benefit from this climate.—SANDGATE, about two miles to the east, offers a milder winter climate, with an exemption from fogs. The mean winter temperature is 41·76°. Consumptive and dyspeptic invalids, who find Brighton too bracing and Hastings too relaxing, may well winter at Sandgate, especially if they need quiet and seclusion.

432. *Sussex.*

HASTINGS AND ST. LEONARDS.—Situated about midway between Brighton and Dover, the climate of Hastings is very useful for invalids during the winter and spring months. Well sheltered from cold winds, with lofty cliffs and undulating downs, a beautiful and cultivated country, a dry and absorbent soil of clay overlaid with sand, a pure sea air, and free from all sources of malaria, Hastings can be regarded as offering a healthy sedative climate during six or eight months of the year. The bathing also is good in the summer.—The mean annual temperature is 50°; that of winter, being 40°, of spring 44°, of summer 60°, and of autumn 53°. The amount of rain in the year equals about 28·34 inches. South and south-westerly winds are most prevalent during the winter and spring, but unless high they cause very little discomfort. In the neighbourhood are various springs impregnated with iron and carbonic acid, but they are not much used.

Hastings is suitable for cases of dyspepsia with loss of tone, chronic bronchitis, neuralgia, chronic rheumatism, gout, and scrofula. For the diseases of childhood it is a good locality. The Author has not seen phthisical subjects derive much benefit from it however; and sometimes he has thought that it seemed to induce hæmoptysis. DR. MACKNESS ("Hastings considered as a Resort for Invalids." London, 1842) has given a table of the causes of death during four years; from which it appears that the total number was 865; of these 254 being from chest affections, and of these latter 161 from consumption,—viz. 91 inhabitants, and 70 visitors.

Although Hastings and St. Leonards now form one town, yet the former is the warmest and most protected, and hence best suited for very delicate invalids. Such as find Brighton agree with them from October until the end of December, may often advantageously spend January and February at St. Leonards.

EASTBOURNE.—Filling, as it were, a chasm between two cliffs, one of which is Beachy Head, this watering place is rapidly increasing in importance. It is visited in the summer for sea bathing; but is a good residence for invalids requiring a bracing air from September until the beginning of January. Cases of scrofula, consumption, hydrocephalus, and tabes mesenterica often derive benefit here. It is also to be recommended in functional disorders of the heart and nervous system.

BRIGHTON.—The climate is bracing and restorative, and is especially beneficial to invalids during the autumn and early months of winter. Although the town is sheltered on the north and north-east by the South downs, yet from the beginning of February until nearly the end of May cold north and easterly winds prevail, which prove very irritating even to the healthy. The annual fall of rain is 25·6 inches. The western is milder but more damp than the eastern cliff; but the tonic air of the latter agrees admirably where the circulation is torpid. The Old Steyne offers a climate intermediate between that of the western and eastern cliffs.

Diseases of a nervous hypochondriacal type are much relieved by the invigorating atmosphere of Brighton. Great good is also experienced when the vital powers are sluggish, when there is anæmia, or when disease of the kidneys exists. Strumous children and convalescents from acute disorders may also be sent to this part of the coast. It is unsuitable for individuals of an irritable or plethoric habit; for such as have a dry harsh skin, or any irritating cutaneous disorder; and for those who have a tendency to asthma, inflammatory affections, hæmorrhoids, &c.

WORTHING.—Lying twelve miles west of Brighton and with an aspect almost due south, this town is fully exposed to the sun's rays. It is sheltered from the hot winds of summer and the cold of winter by the South down hills, which have an average height of 600 feet. Hence it is warm in winter until the middle of February, and cool in summer; the air being neither too bracing nor too sedative. The mean temperature for the year is about 51°. The rainy days are fewer, and the quantity of rain that falls is less than at Ventnor or in the West of England. Occasionally the east and north-east winds render the air very bleak. During summer the fine sands afford excellent bathing.

Worthing can be recommended as a good residence for convalescents; as well as for sufferers from lung diseases, hooping cough, scrofula, chronic rheumatism, and renal affections.

433. *Hampshire.*

SOUTHAMPTON.—At the head of the Southampton Water, which stretches from the Solent and Spithead into the interior of Hampshire for some eleven miles, is the clean and handsome town of Southampton. The climate is said to be mild and humid, intermediate in character between that of Devonshire and Hastings. Though sheltered by the high grounds behind it, and by the New Forest, yet it is unsuited for most invalids, the temperature being variable. The effluvia from the river at low water are often very unpleasant.

A short distance from Southampton Water is NETLEY. Here has been built the Royal Victoria Hospital; which is especially intended for the reception of invalid soldiers from foreign stations, and which has become the head quarters of the Army Medical School. The site seems to have been well chosen; while in most respects the arrangements of the building are excellent.

BOURNEMOUTH.—This favourite watering place, situated within a fine bay, in about ten miles from the western extremity of the Isle of Wight. It is well screened by hills and pine woods from the north and north east winds, but is exposed to the south-westerly gales. Owing to the nature of the soil, outdoor exercise is practicable immediately after rain; while there are great facilities for easy walking. The mean annual temperature is 51·00°; that of winter being 42·38, spring 49·11, summer 60·18, and autumn 51·71.

It may be recommended as a quiet healthy resort, during the winter, for such invalids as are not affected by moderate variations of temperature, for those who are weak without having actual organic disease, and for persons returning from tropical countries. The climate is mild but not relaxing. During the spring and early summer months thick fogs, and cold easterly winds are rather prevalent. In summer there is good sea bathing; but the heat, and clouds of fine sand which rise when there is any wind, render Bournemouth unpleasant to many at this season.

434. *Isle of Wight.*

RYDE.—The towns on the north side of the island—Ryde and Cowes—are more suitable for summer visitors requiring change of air and of occupation, than for invalids needing a dry atmosphere and repose. The air is mild. Although the attractions of both localities are great, yet in neither is the bathing good.

THE UNDERCLIFF.—This is the best part of the island for a winter and spring residence. The Undercliff extends from the village of Bonchurch to Black Gang Chine, a distance of six miles along the south-east coast. The scenery is romantic, sea fogs are rare except towards the end of May and during June, and both soil and atmosphere are dry; while it is well protected, by a range of lofty chalk and sandstone hills, from the north, north-east, north-west, and west winds. It is raised some fifty or seventy feet above the level of the beach; and may therefore be represented, in the words of SIR JAMES CLARK, "as a lofty natural terrace, backed by a mountainous wall on the north, and open on the south to the full influence of the sun from his rising to his going down, during that season at least when his influence is most wanted in a northern climate."—The mean annual temperature is 51·35°; that of winter being 41·89, spring 49·66, summer 60·63, and autumn 53·58. The mean annual fall of rain is 23·48 inches; whereas at Newport, in the centre of the island, it is 33·60.—The best season is from the beginning of November until the end of May: between August and October it is too relaxing and humid.

The Undercliff, of which VENTNOR is the chief town, may be resorted to by all those who need a genial and agreeable winter and spring climate. It allows the phthisical invalid to re-oxygenate his frame by almost daily exercise in the open air, at a season when he would be unable to do so at most other parts of England. The walks are fine and sheltered. The air is mild and yet of a bracing tonic character; and hence it differs from that of *Torquay*, which is of a more moist and relaxing nature. Patients with laryngeal and bronchial affections, hepatic and renal disease, atonic and nervous dyspepsia, and children with glandular swellings or strumous ulcers, do very well at this part of the island.

As a summer resort SANDOWN can be strongly recommended; its beautiful bay and open sea, its fine sands, its good bathing, its dry sandy soil, its good drainage, and its pure and abundant water supply being so many strong recommendations. For some few cases of disease not requiring a mild climate, Sandown may prove serviceable in the winter. The air is bracing as compared with that of Ventnor and Shanklin. The invalid can readily change from one of these spots to the other, if necessary.

435. *Dorsetshire.*

POOLE.—Standing on a peninsula, this old-fashioned town is an agreeable place for such as have to be driven from books and business to quiet and idleness. Owing to geographical peculiarities in its position, the tides in Poole harbour ebb and flow twice in the twelve hours.

WEYMOUTH.—This town, with the adjacent MELCOMBE REGIS, is a favourite summer resort; the beautiful bay of the latter, with its fine sands, being well adapted for bathing. In the autumn and winter the temperature is equable; whilst the air is so pure that it is suitable for invalids from various diseases. Indeed, so healthy is the climate supposed to be, that DR. ARBUTHNOT is reported to have jocosely said,—"A physician could neither live nor die at Weymouth." As it is the nearest English port to Guernsey, seventy miles distant, it forms a station of the mailboats.

436. *Devonshire and Cornwall.*

BUDLEIGH SALTERTON.—A quiet retired village, nearly five miles to the east of Exmouth, in a small open valley on the seashore. For invalids who can climb the neighbouring hills it offers a mild and protected winter residence.

DAWLISH.—Resorted to in summer for bathing, Dawlish may be recommended as a winter resort for those needing a mild air. It is more humid than Torquay. Protected from northerly and south-westerly gales, it is still unfavourable in the spring owing to the biting east wind which finds access to the picturesque valley on either side of which this small town is placed.

EXMOUTH.—The new portion of this town stands high, and is much exposed to wind from every quarter. The old part lies along the margin of the river and the base of Beacon Hill, and is damp; though it has the advantage of being protected from south-westerly and northerly gales. Invalids who require a bracing air may be benefited here; but the cold variable weather in winter makes it unsuitable for those with pulmonary complaints.

SALCOMBE.—Well sheltered, this is said to be the warmest spot on the south-west coast. For such as seek a mild and equable winter temperature, this small spot would be useful were it not for the want of convenient ground for exercise.

SIDMOUTH.—Recommended in summer and autumn for its bathing, Sidmouth is also a good situation for invalids requiring a mild relaxing air during winter. The mean annual temperature is 50·2°; that of winter being 41·9, of spring 47·5, of summer 59·9, and of autumn 51·6.—The annual average rainfall is 27·9 inches, the average number of days on which rain falls in the year being 141. During the years 1865 and 1866 the returns show a much increased rainfall. The soil of the town is gravel on red sandstone: the ground dries quickly after rain, so that the invalid can usually walk out on the Esplanade within half a hour of a heavy shower. The water supply is good.

TEIGNMOUTH.—The mean winter temperature is six degrees higher than that of London, while that of summer is five degrees lower. On account of its exposed position it is not suitable as a winter home for the sick.

TORQUAY.—The climate of this favourite locality, while mild and equable, is less humid than that of many other places on the south-west coast. It has a southern aspect, and is sheltered on all other sides by heights. Mean annual temperature 52·1°; the average for the winter being 44·0, spring 50·0, summer 61·2, and for the autumn 53·1. The average annual amount of rain is 35·20 inches, and it falls on about 175 days in the year. The season is from September to May; and though it is not absolutely necessary for the invalid to leave during summer, yet it will be better for him to do so. November is generally very fine, being bright and sunny.

Torquay is useful in many cases of phthisis, chronic bronchitis, laryngeal affections, and rheumatism. In heart disease, when this organ is oppressed without much lowering of the vital powers; in inflammatory dyspepsia, with an over-irritable condition of the mucous membranes generally; and for invalids returning from tropical climates,—this town may be recommended.

The climate has a soothing influence upon the organs of respiration; but the effect upon the nervous, digestive, and muscular systems varies according to the situation which the invalid adopts for his residence. DR. RADCLYFFE HALL recommends a feverish excitable consumptive patient to lodge in a sheltered part close to the sea, provided sea air does not disagree. When the feverishness is less marked, and there is danger from a sinking of the powers of life, a situation part way up the hills suits better; or the beautiful district of MEADFOOT, protected from the east and north-east by an extensive range of cliff, may be selected if close proximity to the sea be desirable. After a residence at the sea-level for a time, removal to the houses on the southern faces of the hills often proves useful.

ILFRACOMBE.—The fine and bold scenery of this town has attracted the attention of tourists during late years. Situated on the southern shore of the Bristol Channel, surrounded on three sides by the sea, Ilfracombe can be recommended to invalids who require a bracing air. The summers are comparatively cool; while the winters are warm and dry, but invigorating. Convalescents from tropical diseases often derive great good from wintering at Ilfracombe.

Exeter.—This fine old city, though standing upon elevated ground is sheltered. Except during July and August (when it is close and relaxing) it offers an advantageous residence for invalids requiring a residence away from the sea. Its mean temperature in winter is 41·4°, spring 49·5, summer 62·0, and autumn 51·9. The average number of days on which rain falls in the year is 162, the annual amount being 31·90 inches.

Other neighbouring inland towns of Devonshire are agreeable and healthy:—Kingsbridge, Totnes, Newton Abbot, Tiverton, Crediton, Cullompton, Ottery, Honiton, &c. Of the moor towns it need only be said the air is moist and misty. Dartmoor is bleak and chilly, the mornings and evenings even of summer being cold.

Penzance.—This seaport, on the north-west side of Mount's Bay in Cornwall, is about ten miles from the Land's End. The climate is mild but relaxing. It has a mean annual temperature of 51·8°; the mean for the winter being 44·0, for the spring 49·6, for the summer 60·2, and for the autumn 53·3. As a winter residence for invalids it possesses the twofold advantages of warmth, and great steadiness of temperature during the day and night. The disadvantages are that it is much exposed to wind and storm, and that it is humid—the annual rainfall being 44·6 inches. It should be avoided in the spring.

Penzance may be useful in chronic bronchitis, in the earliest stage of consumption if there be a dry harsh cough with scanty expectoration, and in the case of aged invalids who derive benefit from a warm moist atmosphere. It is injurious in phthisis with relaxation of the mucous membranes and copious secretion, in cases of hæmorrhage, in atonic dyspepsia, and in debility of a low nervous type.

Land's End.—The climate somewhat resembles that of South Devon, but as regards humidity and exposure to winds it is inferior to it. Invalids should not remain in this district during the winter and spring.

437. *Gloucestershire and Worcestershire.*

Bristol.—This city, situated chiefly in Gloucestershire, but partly in Somersetshire, has nothing to recommend it to an invalid. A few years since, a gentleman who assured the Author that he always suffered either from gout or asthma, remarked that in Bristol he was generally afflicted with the former, but never with the latter; though directly he left this spot his breathing became impeded. Of the two evils he preferred a smoky city with gout, to pure country air with asthma.

Clifton.—Clifton is built on the sides and summit of a precipitous limestone hill, about one mile west of Bristol. In former days invalids resorted to this spot on account of its hot well: now it is in repute for its mild winter climate. The mean temperature for the year is 51·26°; that for the winter being 39·91, spring 49·79, summer 63·87, and autumn 51·49. The annual rainfall is 32·56 inches, and the number of rainy days about 169. The lower part of the town is much milder, and humid than the upper; and hence while preferable during winter for many cases, is too relaxing in the summer. The loftier situations (such as York Crescent, with its southern aspect and sheltered sunny promenade) are beautifully situated and well adapted for invalids during the summer and autumn months.

The Hot Well lies at the foot of St. Vincent's Rock. It yields an abundant supply of water at about 75° Fahr., containing small quantities of magnesia and lime, with an unusual amount of carbonic acid gas. Owing to the latter, it might perhaps be advantageously taken in dyspepsia with irritability of the gastric mucous membrane; but it is very rarely, if ever, employed medicinally.

Malvern.—Perhaps there are few more healthy and pleasant spots in the kingdom for a summer residence than this. Built on the declivity of the Malvern hills, situated eight miles S.S.W. of Worcester, the scenery is all that can delight the convalescent, or the man who is broken down from overwork. The air is pure and invigorating; and is well adapted for bracing the system of such invalids as can bear an elevated site. Owing to the eastern aspect of the village, the strong winds of the winter and spring are severely felt.

There are two springs in the neighbourhood, which may be frequented for amusement. But the waters of St. Anne's Well and of the Holy Well are only pure and soft; the very small quantities of muriate of lime, sulphate of soda, and carbonate of lime which they contain, being useless in a medical point of view.

438. *Lancashire and Yorkshire.*

Southport.—Situated on the west coast of Lancashire, between the mouths of the Mersey and the Ribble, this watering place is eighteen miles from Liverpool, and thirty-two from Manchester. The climate is bracing and sedative, the air dry but not irritating, fogs are very rare, and the atmosphere is light and pure. The temperature is variable, changes occur rapidly, while the mean for the year is 54°. The sea bathing is good at low water, the shore sandy, the water clear and pure and the bay so well sheltered that it is seldom too rough.

As a summer and autumnal residence Southport is useful in laryngeal, bronchial and pulmonary affections; in tuberculosis; in dyspepsia with constipation and flatulence; in chronic rheumatism; in some forms of paralysis; and in nervous depression after long illness.

Grange in Cartmel.—At the head of Morecambe Bay, sheltered by the hills of the lake district of Cumberland and Westmoreland, it preserves an equable climate, more mild than would be expected so far north. It may be resorted to early in spring and in autumn as well as throughout the summer, and makes a good northern winter residence for invalids. The scenery in the immediate neighbourhood is extremely pretty, and Windermere is within reach by a drive.

Scarborough.—Built on the slopes of a beautiful bay on the Yorkshire coast, in the form of an amphitheatre, this town is resorted to in the summer for its sea bathing. The season extends from June to October. It is suitable for nervous and hypochondriacal patients, for such as have been overworked and need change of scene and amusement, and for convalescents requiring a bracing air.

Close together at the Spa, there are two mineral wells,—the *North* or *chalybeate*, and the *South* or *saline* spring. There is not much difference, however, between their waters; those of both being mildly aperient, alterative, and slightly tonic. Their temperature is about 49°; and they yield nitrogen gas, carbonate of iron, chloride of sodium, sulphate of magnesia (most abundant in the South spring), sulphate of lime, and bicarbonate of lime. These waters may perhaps be useful in habitual constipation, dyspepsia, torpidity of the liver, and scrofulous complaints.

Filey, seven or eight miles to the south of Scarborough, has many of the advantages of the latter, with the additional one for the invalid of quiet and retirement—not to say dulness. To the north is the ridge of rocks, known as "Filey Brig;" while to the south are magnificent lofty cliffs, with Flamborough Head. The sands extend for some miles. At the top of the cliff, on the north side of the town, there is a saline chalybeate spring.

Whitby.—The air of this seaport town is bracing and pure, the sands are extensive and afford good bathing, while there is a chalybeate spring which is thought well of for its mild tonic properties. The country round Whitby offers beautiful rides and walks. As at Filey, the season extends from the beginning of June until the end of September.

Redcar.—This is still further north than Whitby, and enjoys locally the reputation of being the most bracing place on the Yorkshire coast. The surrounding country is beautiful.

439. *Wales.*

LLANDUDNO.—Situated in Caernarvonshire, in the most attractive part of North Wales, this watering place has risen rapidly into favour during the last few years. It is often called the Welsh Brighton. The town lies between two bays—Conway and Llandudno. It is sheltered from the N.W. and E. by the Great and Little Orme's Head, huge masses of limestone rock which rise precipitously from the sea for many hundred feet. In summer the invalid will find a residence on the flat facing Llandudno bay most suitable. The beach is of sand; the bathing is good. For winter, the houses under the cliffs are to be chosen, owing to their sheltered position. The winter climate is comparatively mild.

The geologist will find beautiful and delicate fossils on the Orme's Head (Encrinites of many species, Brachiopodous and Lamellibranchiate shells, as well as several species of Gasteropoda); while the botanist will be delighted with the many uncommon plants to be seen in the neighbourhood. Only four miles distant is Conway, with its most picturesque Castle.

PENMAENMAWR.—Situated at the foot of the mountain of the same name on the north coast near the entrance of the Menai Straits is more quiet than Llandudno, and is preferable to it on many accounts in summer. The bathing here is good, and there are numerous walks and drives in the neighbourhood.

BARMOUTH, on the west coast, has a mild and sedative climate. The bathing is not good, on account of the flatness of the sands, but it affords some of the most charming walks and drives to be met with even in Wales.

TENBY.—This is the most fashionable bathing place in South Wales. Placed on the Pembrokeshire shore of Caermarthen bay, the scenery of the neighbouring country is attractive and beautiful. The sands are smooth and good. The season lasts from June until the end of October. Invalids, however, can often stay with advantage during the winter; the atmosphere being then usually mild and spring-like, while accommodation can be obtained at moderate prices. There are not many days during the winter months when the invalid will be unable to take exercise in the open air.

The number and beauty of the Actiniæ and other zoophytes to be found at Tenby have been made known to all lovers of natural history by Mr. Gosse. There are few places which can compare with it for the seaside naturalist. Moreover, the botanist, geologist, and antiquarian will all find occupation in their favourite studies.

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440. *Ireland.*

KINGSTOWN.—This is one of the best frequented sea-bathing places in Ireland. Situated about seven miles south-east of Dublin, on the southern shore of the bay, the harbour is said to be one of the most splendid artificial ports in the United Kingdom. There are good walks in the surrounding country.

The sharp and bracing air of Kingstown proves injurious, during the latter part of the winter and the early spring months, to patients with disease of the lungs.

HOLYWOOD.—A small watering place much used by the residents of Belfast, from which city it is about five miles distant. The beach is sandy, and good for bathing. There are chalybeate springs in the vicinity.

QUEENSTOWN (Cove).—A town which consists of a series of terraces, built on the southern acclivity of Cove island, in Cork harbour. It is well sheltered from northerly winds; is exposed to the full influence of the sun; and the winter climate is admirable, being mild and equable. The mean temperature for the year is 51·9°; that for the winter being 44·1, spring 50·1, summer 61·3, and autumn 52·0. The annual rainfall is 33·25 inches; the average number of days on which there is wet being 131. The invalid should settle here about the end of October; and he will scarcely have a day during the ensuing four or five months when he will be unable to take exercise in the open air. Owing to the way in which the houses are built, at a variety of elevations, the exact locality chosen must depend upon the patient's malady and strength.

All diseases needing a sedative and slightly humid atmosphere may derive benefit at Queenstown. Laryngeal, bronchial, and pulmonary complaints are especially relieved by a winter residence here; and so also are dyspeptic, strumous, rheumatic, and cutaneous affections. It is admirably suited for delicate children; and for convalescents from hooping cough, eruptive fevers, &c. Functional disorders of the uterine system are often cured by it. In the summer there is excellent sea bathing.—PASSAGE and MONKSTOWN are very healthy villages, situated on the river, about half-way between Queenstown and the city of Cork.

441. *Scotland.*

The climate of Scotland is remarkably equable throughout the year; the summer heat and winter cold being mitigated by the ocean winds. The mean temperature for the year is about 47°; that for the northern counties being higher than for the eastern. The prevailing winds are from a westerly quarter; blowing for more than two-thirds of the year from between the south-west and north-west points. In spring and early summer cold east winds prevail. The atmosphere is moist, nearly 100 inches of rain falling annually in some of the mountainous parts; though along the southern shores of the Firth of Forth the amount is under 30, at Glasgow about 29, and at Musselburgh not more than 24 inches.

The air of EDINBURGH, though neither genial nor mild, is yet salubrious; and is said to be favourable to longevity, as well as to the development of the mental and physical powers. The city extends northwards to the shores of the Firth of Forth; Granton and the old fishing village of Newhaven being only separated from the town by a pleasant walk. The elevated situation of the city renders it exposed to violent winds; but the effect of these is favourable, at all events to the inhabitants of the Old Town, by driving away many impurities. As a place of education for youths needing a bracing climate Edinburgh has great advantages.

The old city of ST. ANDREWS, situated on a rocky promontory some fifty feet above the level of the sea, has a wholesome genial climate. It should be avoided in the spring months, as it is then visited by a disagreeable chilly mist from the north-east; but from July until the end of October the air is pleasant and salubrious. Sufferers from rheumatism, or invalids with weak lungs, had better not remain long in this city. The rate of mortality among the residents is somewhat high.

On the western coast there are several localities which seem to possess good winter climates for invalids. The island of BUTE, in the Firth of Clyde, has many advantages; the air being mild and equable, though rather humid. Its mean temperature for the year is 48·25°; that for winter being 39·62, spring 46·66, summer 58·06, and autumn 48·59. The annual rainfall is 38·62 inches; there being more or less wet on about 150 days. Snow rarely falls in the winter, and there is a freedom from fogs. The island is protected from the east winds of spring; and there are great opportunities for outdoor exercise. The climate being rather sedative, invalids needing a strong bracing air must seek it elsewhere.

Hypochondriacs, sufferers from habitual constipation or sluggish action of the liver, and young men, with a predisposition to phthisis, are often much benefited by a summer or autumnal walk through the HIGHLANDS; and certainly for the overworked literary or professional labourer nothing can be more invigorating than such a tour. "I verily believe that I should die," said Sir Walter Scott, "if I did not see the heather every year."

442. *The Channel Islands.*

All the Channel Islands are remarkable for their beautiful and varied scenery, for the temptations they offer to the zoologist and botanist, the mildness and humidity of their climates, the absence of great heat in summer and great cold in winter, and for the equability and duration of autumn. The east, north-east, and north winds which prevail in the spring, are disagreeable and injurious.

The climate of the Channel Islands is generally favourable in chronic disease, in asthma, in bronchial and intestinal disorders, and in affections of the urinary organs; while it is also suitable for convalescents from acute inflammations of the organs of respiration. The old and the young also are benefited by it: to them the effect is tonic and regenerating. Invalids from India and Australia may winter in these islands with advantage. They are unfavourable in chronic rheumatism, hepatic disorders, structural diseases of the uterus or ovaries, nervous dyspepsia, hypochondriasis, and in cases where there is a tendency to dropsy or hæmorrhage. Pulmonary consumption appears to be as common and fatal among the inhabitants as in most other localities.—The most favourable time for a stay in either of the group is from August until the beginning of February. In some instances, a change for a time, from one island to another, is productive of good.

These islands may be reached by steamers from Southampton or Weymouth in less than twelve hours. Invalids, especially ladies and children, should choose their day of sailing so as to avoid a rough passage across the English Channel; and so that they may not have to land in small boats. The packets can generally enter the harbour of St. Peter's Port in Guernsey, and that of St. Helier's in Jersey, except near low water on a receding tide.

GUERNSEY, the most westerly and exposed of the islands, has an average annual temperature of 51·50°; that for winter being 44·2, spring, 47·7, summer 59·9, and autumn 53·8. Sea fogs are rare, except in the early part of the day in spring and autumn. The air is relaxing. The mean annual rainfall is rather more than 35 inches, falling in heavy showers on about 164 days, and more often in night than day. Percolation takes place rapidly through the gravelly soil; evaporation is also favoured by the brisk wind and sunshine. The walks are too hilly for most invalids. Guernsey is thirty miles from Jersey.

JERSEY is the largest of the group of islands, and the most important; being about twelve miles long, with an average breadth of five miles. The surface of hill and dale is well wooded; the coast is rocky and precipitous; and it is exposed to the wind from every quarter. The mean yearly temperature is the same as for Guernsey; during three quarters of the year the average being higher, while it is lower in the winter. Nevertheless, the latter is mild, frost and snow being very rare. The daily range of the thermometer is small, though it is greater than in Guernsey. St. Helier's contains nearly half the population of the island; but it is more foggy and humid, and therefore less suited for invalids than St. Aubin's, which lies three miles to the south-west of it. The sands are good for summer bathing.

The air of ALDERNEY and SARK is usually said to be drier and more bracing than than of Guernsey; while that of the latter is less relaxing than that of Jersey.

443. *South of France.*

PAU.—This, the chief town of the department of the Basses Pyrénées, is about 125 miles south of Bordeaux and 56 miles east of Bayonne. It may be reached from London in 48 hours; and the season lasts from the beginning of November until the end of May. The mean annual temperature is about 56°. The average for September, October, and November is 56·4; that for December, January, and February 42·8; while for March, April, and May it is 54·0. The annual rainfall is about 43 inches, the rainy days numbering 119. Owing to the gravelly soil any quantity of moisture is readily absorbed. DR. PLAYFAIR, quoted by SIR JAMES CLARK, sums up the nature of the climate, thus:—"Calmness, moderate cold, bright sunshine of considerable power, a dry state of atmosphere and of the soil, and rains of short duration. Against these must be placed,—changeableness, the fine weather being as short-lived as the bad, rapid variations of temperature, within moderate limits. In autumn and spring there are heavy rains." The air in December, January, and February is dry, and out of the sun, cold; but even in these months the rays of the latter are so powerful that the pedestrian ought to protect his head with an umbrella. There are very few days on which the invalid will be unable to take exercise between 12 and 3 o'clock. The evenings, however, are chilly, and the nights cold.

Pau is not influenced by the west-north-west wind, the *Circius* of the ancients; nor by the north wind or *Bise* which produces a biting cold; nor by the north-west wind or *Mistral:* in fact the climate is calm and soothing, high winds being rare. According to some physicians Pau is useful in cases with a scrofulous taint, in preventing generation of tubercle, and in checking softening of tubercle when formed. DR. TAYLOR states, that the predisposition to disease favourably influenced by this town, may be summed up in one general principle :—viz. wherever it depends upon increased nervous and arterial action, permanently produced, either by temperament or by some cause leading to more active disease.

The climate is sedative (not to say depressing), modifying nervous and vascular irritation ; and therefore beneficial in irritations of the mucous membranes of the air-passages or alimentary canal.—It is unsuitable where the powers of life are declining ; in chronic catarrh or bronchitis of old people, with loss of tone and excessive expectoration ; in chronic rheumatism or gout, with debility of digestive organs ; in tendency to apoplexy from passive congestion ; in chlorosis ; and in disorders attended with congestion of the venous system and diminished nervous energy. In all these cases the climate of Mentone (from the commencement of November until the end of February) is the remedy. In short, Pau is to be chosen when there is "functional derangement of a tonic irritable type, which paves the way to organic mischief." Acting on persons in health the air lowers the tone; makes the sanguine, phlegmatic ; and the choleric, melancholic.

BIARRITZ.—A fashionable sea bathing village on the shores of the Bay of Biscay, some 5 miles south-west of Bayonne, and 65 miles from Pau. The roads between the two places are excellent, and communication by diligence or omnibus very easy. It can be reached from London in about 48 hours. The air is warm ; the temperature of the sea high ; and there is always a soft invigorating sea breeze. When benefit has been derived from a winter at Pau, it is often advisable for the patient to go to Biarritz for the summer ; returning to Pau for a second winter. The sandy gently-shelving beach is well adapted for bathing, which is no slight luxury in water at a temperature of 75° Fahr.

According to DR. HENRY BENNET, the climate not only renders Biarritz a favourite summer and autumn watering place, but puts it among the eligible winter stations of the south. It is cheaper also in winter than summer, being then almost deserted by fashionable vistors. In cases of severe desease it is not equal to Pau, Ajaccio, or Mentone, the winter breezes from the Bay of Biscay being often very violent.

MONTPELLIER.—The reputation which this city formerly enjoyed as a winter residence for consumptive patients has entirely gone. The climate is dry, irritating and changeable ; and though the heat of the sun is great, yet the winter winds are cold and unbearable. Mean temperature of the year 59·5° ; winter 44·2, and summer 76. Phthisis is very prevalent amongst the native population. Invalids with relaxed mucous membranes and copious secretions, sometimes find advantage from spending the autumn here.

MARSEILLES.—This city, second only in importance to Paris, offers no residence for the invalid. Pulmonary consumption annually destroys a large number of young women and men. Catarrhs, pleurisy, and pneumonia are common ; and so are cutaneous affections, diseases of the generative organs, and cancer.

Mean annual temperature 58·32° ; winter 45·22, spring 55 91, summer 72·93, and autumn 59·21. Although these figures are high, yet the winter is sharp and cold, the winds being high and prevalent - especially the mistral (north-west). In spring, the variations in temperature are sudden and dangerous, and there is much rain. During summer the heat and dust and insects are intolerable.

HYÈRES.—This little town is agreeably situated, about two miles from the shores of the Mediterranean, and an hour and half's drive from Toulon. The climate is clear, pure, dry, and tolerably mild. The greater portion of the town is sheltered from north and east winds ; while it is open to the south, benefiting by the influence of the sun and sea breezes. But it is exposed to the mistral, as there are no protecting hills on the north west ; and this blows frequently during the first three months of the year. It has been thought one of the best localities in the South of France for the winter abode of invalids with pulmonary disease, as there is much fine weather, without great variations in temperature. The mornings and evenings, however, are cold; and hence, remembering too the prevalent winds, it should not be recommended. In summer the heat and dust prove very annoying. The best season is during April and May, or from the beginning of September to the end of November.

Cannes.—An agreeable seaport, on the shore of a small bay, well protected from cold winds. It has a climate more moist and sedative than Nice, and less so than Pau. The lower parts of the town should be avoided, as the drainage is bad. The overworked man of business, seeking fresh air, genial sunshine, and a locality possessing a combination of fine sea and mountainous scenery, may advantageously winter here. Cases of nervous dyspepsia are particularly benefited, and so are some forms of phthisis.

In the summer Cannes is resorted to for sea bathing, the extensive sands being well adapted for this purpose. Sand baths are sometimes used for the relief of rheumatic and paralytic affections of the limbs; the patients being immersed up to the chest in sand warmed by the sun. Like mud baths they may serve to amuse the invalid, while he is breathing pure air and living by rule.

Nice.—The reputation long enjoyed by Nice for salubrity, has been found to have been greatly overrated. Protected towards the interior by the Maritime Alps and the Estrelles, cooled by the breezes of the Mediterranean, and with a mild dry climate, it would seem to be a favourable locality for phthisical patients. But notwithstanding these advantages the valley is exposed, during winter and spring, to cold irritating winds from the east and north-east; and the Nisands then suffer much from catarrh, ophthalmia, skin eruptions, pneumonia and irritable gastric affections.—The mean temperature for the year is 59·01°; for winter 46·33, spring 55·92, summer 71·83, and autumn 61·52. The variations between the warmth of night and day, of sun and shade, are remarkable. The annual rainfall is about 26 inches; most falling in October and November, leaving the other winter and spring months comparatively dry.

M. Carrière has compared the valley in which Nice is situated to an open fan, the arch of which is formed by the mountains, and the point by the shore, where the Var discharges itself into the sea. But the mountainous semicircle is indented in parts, and down these interruptions the winds blow from certain points and injuriously affect consumptives.—The mistral is "the scourge of the Mediterranean shores of France and Sardinia." It may continue one, three, seven or more days at a time: in autumn and winter it blows frequently, and hence it is absurd for invalids requiring a mild temperature and calm atmosphere to winter at Nice. The south east wind, or sirocco, so injurious on the continent of Italy, becomes changed into a mild beneficial breeze during its transit across the Mediterranean to Nice; and hence it modifies winter cold, and summer heat and dryness. *La Croix de Marbre*, the suburb of Nice inhabited by the English, is most unfavourable for pulmonary invalids; being exposed to the libeccio (a relaxing south-east wind), and to the blighting influence of the mistral. The invalid if he will go to Nice should live at the foot of the heights, in one of the shady valleys open to the south. The brilliant sun entices him out of doors, and then the blighting piercing wind attacks him, and clings around him: no furs, no heavy cloak, no flannel will keep out the cold. He ought not to venture into the open air too early in the day, nor should he remain there later than one hour before sunset. The bills of mortality of the Nisands give one seventh of the deaths as from phthisis. That "Nice is one of the last places to which a foreigner labouring under tubercular phthisis should resort," is the opinion of Dr. Burgess. It is also unfavourable for nervous and susceptible invalids. The air may sometimes be beneficial in chronic rheumatism and gout; in all uterine derangements connected with a relaxed and torpid state of the system; for delicate children of a strumous habit; and for invalids returning from tropical climes. The stay should extend from the middle of October until the beginning or middle of January; for although the season lasts until the end of April, yet the invalid will seldom derive benefit from prolonging his residence beyond January. The Author has been told that there are well-conducted Pensions both at Nice and Cannes which are preferable to the hotels as being more quiet and homelike.

Villa Franca.—This little town, a short distance from Nice, has a climate somewhat warmer and drier, and is less exposed to the north and north-west winds. The vegetation is luxuriant and early.

Mentone.—Lately a small Italian town, but annexed to France in 1860, Mentone offers one of the most sheltered stations in the south of Europe. It is situated on the northern shore of the Mediterranean, at the foot of the Maritime Alps, and twelve or thirteen miles to the east of Nice on the road to Genoa. The bay, in the centre of which the town is placed, is completely protected from the north, north-west or mistral, and north-east winds by the mountains; while owing to the absence of fogs, the paucity of rain, and the great power of the sun, the air is very pleasant during the winter months. The mean temperature is a little higher than that of Nice. The night temperature is also mild, and not subject to great variations; so that many invalids are able to keep the air of their bedrooms pure by sleeping with the windows slightly open.

From the beginning of November until the end of April the climate is genial and bracing. The invalid must not remain during the summer. A residence here is very useful in phthisis, when the disease has not passed beyond the first stage; and even when it has reached the second or third, provided the tubercular deposit be limited to a part of one lung. It is also beneficial in chronic cases of consumption; chronic bronchitis; and chronic gout and rheumatism. Strumous children improve remarkably. Some who visit Mentone prefer the eastern bay, some the western; but whichever be chosen, care must be taken to select rooms having a south aspect, and with the bedroom not on the ground floor. According to Dr. Henry Bennet pulmonary consumption is a rare malady among the native population; the deaths from it being only 1 in 55, instead of 1 in 5 as in London and Paris.

For the sake of those who are not overburdened with wealth, it may be as well to remember that Nice and Mentone are both extravagant places, while *San Remo* is much cheaper, and the air is just as good during the winter. Moreover, twelve miles east of Mentone and seven miles west of San Remo lies *Bordighera*. It faces the south, in a fine bay protected from the due east and west winds by ranges of hills. The air is mild and exhilarating. The walks are good, being well protected from dust and wind. The palm, olive, orange, and lemon all flourish on the hill, nearest the town. And lastly, the pleasure of staying at San Remo, or at Bordighera will be enhanced by reading a very charming tale—Doctor Antonio.

444. *Corsica.*

This island, one of the most important in the Mediterranean, has shores mostly low, while the centre is mountainous. Corsica is healthier than the Riviera, and its air is more genial. The olive is indigenous. The scenery is grand. Within a few hours' drive of Ajaccio are several villages in the hills (*Orezza* with chalybeate springs, *Guagno* with sulphur springs, &c.), where invalids might reside during the summer after having wintered in Ajaccio. This clean and cheerful little town, on the west coast, is said to be especially charming during the months of January and February. The gulf of Ajaccio offers an excellent harbour for yachts; while it is protected from all winds but the south-west, by its hemicircle of grand mountains in the distance. The sandy shore, with beautiful rocks, is greatly to be preferred to the shingly beach at Nice. The climate is as warm as that of Nice, and it is unexceptionally healthy. The air of Ajaccio is more soothing (less stimulating) than that of Mentone, without being relaxing like that of Madeira. Napoleon Bonaparte was born at Ajaccio on 15th August, 1769.

Ajaccio is the only locality in Corsica that appears thoroughly eligible as a winter residence. The climate of Bastia is warm and agreeable; but the town has a small tideless port, and is exposed both to south-east and north-east winds. Dr. Manfredi, the surgeon of the civil hospital at Bastia, states that nearly all surgical wounds heal at once by first intention, while purulent absorption is almost unknown. Intermittent fever prevails in parts of Corsica towards the end of summer or beginning of autumn. It may be reached from Marseilles by steamer in fourteen or sixteen hours, or from Nice in eight or nine hours, and is thus within about forty-eight hours of London.

445. *Spain and Portugal.*

ALICANTE.—Lying along the shores of a bright open bay in the Mediterranean, is this healthy town. It is sheltered on the north and north-west sides by a limestone rock some 700 feet high, is free from malaria, and has a mild dry air with comparative immunity from high winds. The mean annual temperature is 63·7°, that for winter being 52·1. The rainfall is very moderate. In summer the calm open sea, and sandy beach, afford good bathing. In winter, whatever may be the temperature of the morning air, the middle and after part of the day will generally be mild and calm.

As a winter residence it may be recommended to such as need a dry and somewhat stimulating climate. It has been found useful in chronic bronchitis, with excessive secretion; as well as in atonic dyspepsia.

BARCELONA.—This, the chief city of Catalonia and the second in importance of Spain, has a mild winter air. It is open to the sea on the south and south-west, and is partially protected from westerly and northerly winds by the hills at the back. The mean annual temperature is 63·14°, that of winter being 59·18; while there is rain on some 69 days in the year. Invalids requiring a rather stimulating and dry climate may reside here, but it cannot be strongly recommended. April and May are the most uncertain months.

CADIZ.—The semi-insular position of this commercial town, on the shores of the Atlantic, would seem to point it out as a suitable winter residence for those requiring sea air. The climate is soft, humid, and relaxing; the winters are mild and the summer temperate; the weather is showery, especially in winter and autumn, but the soil being porous, it soon dries; and there are few days during winter on which exercise cannot be taken in the open air. The mean annual temperature is 62·75°; that for winter being 52·80, though very often at this season the thermometer, in the shade, will stand at above 60. Rain falls on about 100 days in the year; but it generally comes in showers, with intervals of sunshine.

This town may be recommended for some irritable affections of the chest, and in certain cases of heart disease. Women with any tendency to ovarian or uterine disorders should avoid Cadiz. The stranger will find it best to reside in the central portion of the town,—as on the sunny side of the square of General Mina or San Antonio, or in one of the lesser plazas. The wall (Muralla del Mar) which nearly surrounds the town has on its summit an agreeable walk.

MADRID.—The capital of Spain, situated nearly in the centre of the Peninsula, is perhaps an attractive city for the tourist; but the irritating and stimulating character of the climate renders it an unfavourable one for the English invalid. The mean annual temperature is 57°; but the range is so great that DR. FRANCIS has observed a thermometer pointing to below freezing a little after sunrise, stand at 106 at 3 o'clock P.M.—The winters are raw and long, with hard frosts and piercing cold winds: in summer the heat is irritating and oppressive, so that even the Spaniards cannot stand it.—"The subtle air," says FORD, in his Handbook, "which will not extinguish a candle, puts out a man's life. * * * * * No wonder, according to Salas, that even the healthy of those born there live on physic."

MALAGA.—DR. FRANCIS speaks very highly of *Malaga*, which, indeed, seems to be the El Dorado of cities; for he asserts that there is no place in Spain, nor in the whole of Europe, as far as our present information goes, that possesses a climate at once so mild and equable, with so little variation from day to day. This seaport city is situated on the shores of a bay of the Mediterranean, 65 miles east-north east from Gibraltar. The mean annual temperature is 66·11°, that of winter being 54·41; the heat of January corresponding with that of May in London. The air is neither too moist, nor too dry; and a lofty mountain range forms a protecting background to the winter winds. The annual rainfall is said to be only 16½ inches.

The longevity of the people is remarkable: persons aged from 80 to 90 being seen going about the streets in full possession of all their faculties. Though the ratio of mortality is one in 37, yet it must be remembered that this is larger than it would otherwise be, not only from the excessive mortality in early life (42·3 per cent. during the first five years) owing to the mothers not nursing their infants, but likewise from the presence in the town of a large garrison and a crowded convict establishment. The principal drawback seems to be the terral, a cold harsh wind from the north-west, which occasionally blows during the winter with great force. It causess restlessness and oppression at the chest, where there is any pulmonary affection. The air is also unfavourable in cases of disease of the nervous centres.

The invalid who requires a warm, dry, and gently tonic climate, with constant sunshine, may well visit Malaga for the winter. A residence here is especially useful when phthisis seems to threaten, or even when it is present in an early stage. He should live in the newer part of the town, where the soil is sandy, and through the centre of which runs the Alameda, a fine broad promenade bordered by cheerful well ventilated houses. The Spanish custom of taking a siesta in the middle of the day ought to be adopted. There is regular steam communication with Liverpool, the voyage lasting seven or eight days.

VALENCIA.—This city, built upon the great plain of Valencia, is about three miles from the sea. It may be reached in seven days from England, by way of Marseilles.—The town is very clean, the climate unusually dry, though the water evaporated by the system of irrigation pursued impregnates the air with moisture; there are no cold fogs; the wind is soft and mild during winter, in summer refreshingly cool; and the mean annual temperature is 63·5°, that of winter being 49·7. The cold is often appreciable in early morning and after sunset during winter, but it is warm by midday. The springtime is the best—from the middle of February till the beginning of May: autumn is to be avoided, owing to the miasmata from the rice plantations.—Consumption is not uncommon among the poor; but then in no part of Spain does the labourer work harder, or subsist on a more meagre diet.

Useful for the overworked man of business, semi-invalids and hypochondriacs, individuals with impaired health but no organic disease, gout and rheumatism, calculous affections, albuminuria, and nervous dyspepsia. There are several towns within easy reach of Valencia where the invalid may go for a short stay,—such as *Alcira, Carcajente, Jativa, San Felipe, &c.*

SEVILLE.—The famous capital of Andalucia, and the city of Figaro, possesses a soft and tonic climate. It may be visited by the hypochondriac, by convalescents from lingering disease, &c.; or the invalid who has wintered in Malaga might advantageously stay here during May. The best part of the year is from November to March. There is considerable rain in October, November, and April. Occasionally during the summer the sultry and irritating levante or east wind prevails, giving rise to fever, ophthalmia, mental irritability, and neuralgic affections.

ARANJUEZ.—Situated 24 miles south of Madrid, on the left bank of the Tagus. The season consists of April and May, during which months the climate is soft and most agreeable. The water of the town contains a little sulphate of soda, and hence it sometimes proves aperient if taken largely.

LISBON.—The capital of Portugal has a dry and bracing climate; though the changes from sunshine to rain, from heat to cold are sudden and remarkable. Hence it is not to be recommended for pulmonary invalids; while, moreover, phthisis is very prevalent among the inhabitants.

The mean annual temperature is about 62·00°; that for winter being 52·52, spring 59·66, summer 70·94, and autumn 62·48. The annual rainfall is 23 inches, most wet days occurring in winter. The predominating winds are those from north-east to south-east, and to them is due the cold of winter.

DR. FRANCIS says that the best situation for an invalid who wishes to pass the winter in Lisbon, is the upper part of the Val de Pereiro; a continuation of the valley in which the new part of the town and the public gardens lie. "Here, upon the southern slope of the hill, are a few villas in the midst of orange gardens, which are well sheltered, and afford choice views over the town and river. Those who prefer a country residence, may select the neighbourhood of *Bemfica*, a village on the Cintra road, about a league from Lisbon. This place is in high reputation, among the Portuguese physicians, for the purity of the air, and it is here they send their convalescents."

CINTRA.—A summer residence of the court and wealthy inhabitants of Lisbon, from which it is only sixteen miles distant. Frequent breezes, a humid soil, and an abundance of vegetation render the summer air cool and healthy. The winters are wet and cheerless.

446. *Gibraltar.*

This strongly fortified portion of the British possessions occupies a mountainous promontory near the southern extremity of Spain, at the entrance of the Mediterranean. The town is built on the western aspect of the rock. It is unsuitable as a residence for invalids. For though the average winter temperature is 57·93°, yet the prevalence of the south-east wind—the levante—renders the locality cold, raw, and very unpleasant. Snow and ice are very rare, but there is considerable rain. The annual rainfall is 43 inches.

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447. *Italy.*

Lago Maggiore.—The largest of the lakes of Northern Italy. Along its shores are small towns resorted to by English invalids in summer. *Baveno, Arona,* and *Sesto* are the most frequented. But the climate, though clear and pure, is often marred by the violent thunderstorms which prevail in summer; there are heavy dews at night; while the neighbouring glaciers make it cold when the wind blows from that quarter. The air is injurious to phthisical invalids, but useful in general debility, in dyspepsia, and for such as need a cool tonic atmosphere.

Lake of Como.—Situated to the north-east of Milan, from which it is not far distant.—The air is genial and mild, the temperature equable, and the heat not oppressive owing to the alternate play of the tivano or north wind during the night, and the breva or south wind in the day.—For ordinary invalids in summer the best situations on the lake are *Balbianino*, *Torno*, and *Bellagio;* but for the consumptive *Varena* is more suitable. *Cadenabbia* and *Tremezzine*, on the shore near the middle of the lake, are very beautiful spots; while according to Dr. Burgess, *Pliniana*, the most noted spot along these classic shores, the supposed residence of Pliny, will not yield precedence to either in climate or situation. The cold in the winter is great, especially at the northern extremity of the lake.—No part of Italy perhaps is so suitable for the consumptive in summer, as the Lake of Como. That dreaded disease called pellagra, a kind of leprosy, is not uncommonly seen here. From one third to a fourth of the lunatics in the Lombardy Asylum are suffering from it, for it induces insanity; while many cases of it, in early stages, are to be found in the hospitals.

Milan.—This city, the capital of the Lombardo-Venetian kingdom until 1859, when it was made over to Sardinia, is situated in a fertile plain between the Olona and Saveso Rivers, at an elevation of 394 feet above the Adriatic. It is indifferently sheltered from the various winds, so that the climate is cold; snow and rain are frequent during the winter; while the sudden transitions from humidity to a dry harsh air, render it an unfavourable locality for any but the strong. It is frequented by consumptives going to, or returning from the south of Italy; but the shorter their stay, the better. In 1831, official returns showed that amongst the Milanese alone, 20,000 individuals were attacked by pellagra.

Brescia, Pavia, Verona, and Mantua.—The principal towns of Lombardy, are all particularly unsuitable for invalids. Agues, fevers, and inflammations are very common. The cold in winter is intense; the atmosphere is saturated with moisture: there are dense clouds and fogs; there are large quantities of rain, in the form of a fine continuous drizzle; and cold winds are very prevalent, especially the north-east.

Venice.—This city, the Queen of the Adriatic of the poets, is built on piles, in the midst of a lagoon or large marsh, two miles from the mainland of the Continent. It would seem to be slowly crumbling to decay. The climate is mild and equable; the air being impregnated with emanations of bromine and iodine. Consumption is prevalent among the inhabitants. Invalids are not attracted to Venice by the climate, however, but by its historical associations, and many sickly persons are to be found on the favourite promenade—the Piazza of St. Mark. The mean temperature of winter is about 39° F., of spring 54, summer 73, and autumn 55. Drizzling rain sometimes falls for days together. The result of seven years' observation gave a mean of 5½ days of snow in winter.—In Venice the dolce far niente practice is fully carried out; the climate being favourable to indolence and voluptuous ease. Contrary to what might be expected, ague is unknown. The tranquillity which prevails over the city is not unfavourable. As the climate is sedative and lowering, it is not fit for those who are depressed by disease; and except in the early stage it is injurious to phthisical patients. It is suitable for such as have a tendency to inflammation, hæmoptysis, &c. Invalids may remain here from the close of autumn to the end of spring; but it is most agreeable in the latter season.

Genoa.—This town, at the head of the Gulf of Genoa, is one of the last places for a consumptive to pass any time at. The vicissitudes of temperature are rapid, and extensive; there are sudden gusts of wind; while the biting coldness of the tramontana or north wind, alternating with the warmth and humidity of the sirocco or south-east, the two prevailing winds of Genoa, proves very trying. The best time for a visit to Genoa (not by a consumptive) is about the autumn or beginning of summer. Pneumonia, hæmoptysis, consumption, and catarrh, are amongst the most frequent diseases of the inhabitants.

Florence.—Situated on the Arno, a few hours' ride from Pisa, this city may be an agreeable residence for the very strong. But certainly in no part of England could a more unfavourable climate be found for consumptives. It is built in a deep ravine, almost surrounded by the Apennines, and intersected by a squalid river. It is one of the stations on the western zone of Italy where it rains the most. Extreme cold in winter, great heat in summer, chilling northerly winds, occasional fogs, violent atmospheric and thermal variations,—these are its chief peculiarities in a sanitary point of view. The nervous excitability of Florentines is explained by the topography of the city. As the birthplace of Dante and Leonardo da Vinci and Machiavelli, &c., as the scene of Savonarola's preaching and martyrdom, as well as for its churches and palaces and magnificent works of art, Florence offers many attractions to the tourist.

Pisa.—The dismal aspect of this neglected city surpasses that of any other in Italy. The dreary solitude of the streets causes gloom and melancholy; while everything seems stricken with decay or death. It is often recommended for consumptive invalids; but the climate is mainly indebted to tradition—being mild, humid, and relaxing. The sky is dull and often murky. Perhaps the high walls around Pisa assist in protecting portions of it from the cold winds, especially the Lung' Arno, or that quarter where the invalids reside. The mean temperature of winter is about 45°, spring 59, summer 74, and autumn 63. The winter is colder than at Rome. The air is moist from the great prevalence of southerly and Mediterranean winds. The climate is very depressing—causing general lassitude while it enervates the faculties. Many foreign invalids die within a few weeks of their arrival. Hæmoptysis frequently sets in where there is any tendency of phthisis.

Rome.—Situated on marshy ground at the foot of a range of low hills, about fourteen miles from the sea, and divided by the Tiber into two unequal portions. Rome has not so much to recommend it to those really in search of health as many other places. The climate is mild, soft, and sedative; but malarious effluvia, in a greater or less degree, are never absent. The best time in the year is October and the first ten days of November. The mean annual temperature is 60·49°; that of winter being 46·75, spring 58·25, summer 74·24, and autumn 62 75. Owing to its exposure to cold winds, the variations in temperature are great and sudden. Northerly winds are common in the morning and evening, though in the middle of the day the wind blows from the south. The tramontana is cold and searching; but the prevalent wind is the sirocco from the south-east, which is hot, sometimes dry, and sometimes so moist as to render the streets slippery and damp. Under its influence the tissues relax, appetite fails, bowels become torpid, spirits flag, and the weakly get oppressed with lassitude and headache. If an invalid will go to Rome in the winter, let him spend as much time as he can in St. Peter's. No other public building can compare with this church as regards possessing a dry equable temperature all the year round. The mild genial air in its interior is so prized, that the sickly meet and promenade in St. Peter's when the weather will not permit of exercise in the open air.

DR. BURGESS entertains a very unfavourable opinion of the sanitary value of this city. And he points out that the popular feeling in favour of a mild and relaxing climate for consumption is altogether wrong, being based upon erroneous data, if not upon mere tradition. A cold climate, such as that of Norway or of Canada, and still air, are evidently more rational indications, if the formation of tubercle is the result of a relaxed state of the vital functions, involving impaired digestion, depraved nutrition, and degeneration of the blood. Nothing is more calculated to derange the digestive organs than the sedative influence of a malarious atmosphere. The mild climate allays bronchial irritation, at the expense of the general health and of disordered nutrition.

The most fitting localities in the city for the invalid with any bronchial irritation, chronic rheumatism, &c., are the north and west sides of the Piazza di Spagna, as having a southern exposure; or he may choose one of the streets running east and west from, and near to, the Piazza,—the Strada de' Condotti, Strada della Croce, Strada Frattina, &c., the north sides of which gain the southern sun, and all of which are on sheltered ground. The south side of the Strada del Corso should be avoided, as the Tiber frequently overflows in winter, generating low fever, &c. The Piazza del Popolo is also subject to damp fogs. In most cases the second and third floors of a house are preferable to the first; since, owing to the narrowness of the streets, they are more exposed to the sun. The higher and more exposed ground of the Monte Pincio, Via Sistina, Piazza Barbarina, &c., is suitable for those with healthy chests, and who can bear a high wind.—The stay may extend from October till the end of May.

NAPLES.—The climate somewhat resembles that of Nice, but is more variable and humid. Situated on the northern shore of the Bay of Naples, on the slopes of a range of hills, near the foot of Vesuvius, this city seems to offer all that is charming to the man in health, and everything that is pernicious to the invalid. The mean annual temperature is 60·26°; winter being 47·65, spring 57·56, summer 74·38, and autumn 61·46. Besides other winds, it is exposed to the sirocco or south-east, which is enervating to both body and mind; as well as to the mistral or north-west, which brings raw piercing cold and damp. Catarrh, pneumonia, phthisis, rheumatism, ophthalmia, uterine disease, and cutaneous affections are common amongst the inhabitants. EUSTACE says, and apparently with reason,—"If a man be tired of the slow lingering process of consumption, let him repair to Naples; and the dénouement will be much more rapid." Indeed, so fatal is the climate to invalids with pulmonary disease, especially during the winter, that the proverb,—"Vedi Napoli e po' mori," may be interpreted in a more literal sense than that intended.

BALÆ AND POZZUOLI.—Situated in the vicinity of Naples, these towns are recommended by M. CARRIÈRE as winter residences for invalids already sojourning in the Neapolitan territory. The air is humid and warm, and little disturbed by violent winds. But the undrained swamps in the neighbourhood of Baiæ, and the fatality of phthisis at Pozzuoli ought to deter any invalid from leaving England for these stations of classic renown, however anxious he might be to escape to them from Naples.

ISCHIA.—The island of Ischia, in the Mediterranean, can be reached by steamer from Naples in about three hours; or the sea passage may be much shortened by driving from Naples to Miliscola, crossing over to the small island of Procida, only two miles and a half distant, and thence to Ischia, which is separated from Procida by a channel two miles in breadth. The circumference of Ischia is rather more than twenty miles. Nearly in the centre of the island is Monte Epomeo (the Mons Epomeus of the ancients), the highest point of which is 2574 feet above the level of the sea. Bishop Berkeley seems to have been delighted with a three or four months' residence at Ischia. Thus he speaks of the island as "an epitome of the whole earth;" containing within a compass of eighteen miles a wonderful variety of hills and valleys, ragged rocks and fruitful plains, barren mountains and beautiful vineyards, cornfields and orchards, natural fountains and rivulets, &c., "all thrown together in a most romantic confusion." The air in the hottest season is refreshed by cool sea breezes. The hedgerows are of myrtle, with the aloe and prickly pear; and there is an abundance of delicious fruit.

The baths of Ischia have been in repute for centuries. Strabo and Pliny were acquainted with the virtues of some of the waters. Their chief characteristics are the large quantities of chloride, sulphate, and carbonate of soda which they contain; combined with magnesia, lime, &c., and a large volume of carbonic acid gas. Their temperature is high: *e.g.* that of the Aqua del Tamburo is 210° Fahr., and that of Petrelles on the south side of the island 205°.

The principal and most picturesque village on the island is *Casamicciola;* which is situated on high ground behind Lacco, is sheltered on the north-west and south sides by Monte Epomeo, and is in the neighbourhood of the chief springs now in use. These springs rise in the Val Ombrasco, a ravine at the base of Monte Epomeo. The most celebrated spring is the *Acqua di Gurgitello,* which is used for bathing and drinking. It contains chloride of sodium, carbonate of soda, sulphuretted hydrogen, and nine cubic inches per cent. of free carbonic acid gas; while the temperature of the water is often as high as 170° Fahr. This spring is useful in cases of chronic gout and rheumatism, sciatica, scrofula, nervous irritability, &c.

Near the Gurgitello is the *Aqua di Caponne,* used for drinking only. The water, like that of Wiesbaden, has the taste of chicken broth: the temperature is 98° Fahr. DR. A. VANS BEST tells the Author, that the Italians praise this water for its good effects in renal, vesical, and uterine complaints.

Below Casamicciola is the pretty village of *Lacco;* in which are the hot air and sand baths of *Santa Restituta e Regina Isabella.* The most celebrated natural vapour bath in the island is the *Stufa di S. Lorenzo;* the steam for which is discharged from crevices in the lava at a temperature of 135° Fahr.

Independently of its remarkable mineral springs the climate of Ischia is delightful. The evenings are rather cold during the winter and spring months, but the air is genial throughout the day. The heat of summer is mitigated by the sea breezes, while the vines and orange trees afford a beautiful shade. A stay of some weeks on the island can be recommended in hepatic and splenic disorders, in the early stages of Bright's disease and other forms of renal mischief, as well as in gouty and rheumatic and neuralgic affections. Invalids from India might well be advised to recruit at Casamicciola.

448. *The Ionian Islands.*

This group of islands in the Mediterranean, off the west coast of Greece and Epirus, ceded to the Greeks by Great Britain in 1863, consists of *Corfu, Cephalonia, Zante, Santa Maura, Ithaca,* with many smaller islands. Their surfaces are mountainous and rugged, but in some of the larger islands there are fertile plains. They vary but little in climate; the winters being stormy and wet with northerly winds, the springs warm, and the summers dry and hot. Intermittent and remittent fevers, dysentery and diarrhœa, phthisis and pneumonia are prevalent. As a tour for the hypochondriac a visit to these islands may be recommended.

449. *Malta.*

Of an area not much exceeding that of the Isle of Wight, this island forms the chief station of the British fleet in the Mediterranean, and is daily called at by ships of all nations. The atmosphere is clear and bright, the annual rainfall about 15 inches, the air mild and bracing in winter, and the temperature equable with a yearly average of about 64°. Heavy gales of wind are not very frequent, though the atmosphere is never entirely calm. The gregale or north-east wind is cold in winter, and often does damage in the harbour of Valetta; while the sirocco or south-east prevails especially in August and September, is hot and humid, and produces lassitude with debility.

The REV. JAMES SHERMAN, who suffered from consumption, writing from Malta on the 16th January, 1861, said,—"A blazing sun shoots his rays into my room, and a delicious breeze makes it sufficiently cool. I look out on a sort of Regent Square—people traversing up and down in crowds—a beautiful garden opposite my window, with hundreds of oranges on the trees—priests, beggars, and guides jostling one another in every direction—a side view of the ocean—a deep blue sky, without a cloud—and at night the stars looking so large, near, and brilliant, that I can scarcely believe I am only 4½ days from the frost and snow of England. The climate seems most delicious, and well adapted to invalids."

The weather is most agreeable from the middle of October until the end of January. Asthma connected with chronic bronchitis, atonic dyspepsia, strumous glandular swellings, and deranged health from overwork,—these are the cases which are most likely to be benefited by a stay in the cheerful bustling capital of Valetta.

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450. *Egypt.*

One of the earliest civilized localities of the world, this country has long been divided into the provinces of *Saïd* or *Upper Egypt*, *Vostani* or *Middle Egypt*, and *Bahari* or *Lower Egypt*. Upper and middle Egypt are more healthy than the Delta. There are only two seasons in Egypt,—the temperate from October to March, and the hot from March to October. At *Cairo*, the capital, the climate is healthy, little variable, and remarkably dry; rain falling very rarely. The nights and early mornings during winter are cold, especially those of the last half of December and the first fortnight of January. The mean temperature of the year is 72·2°; that of winter being 58·5, and of summer 85·1. Taking the whole of Egypt the mean temperature in December, January, February, and March may be said to be about the same as that of this country in June, July, and August. Between April and June a hot wind sometimes blows from between the south and south-east. It is known as the "khamseen," because this word is the Arabic for fifty; and these winds are most prevalent during the fifty days preceding Whitsuntide. A khamseen may continue for two or three or more days; the air is rendered hazy from the sand and dust suspended in it; while the thermometer, in a sheltered spot, will often reach 110°.

The invalid should leave England rather early in October, so choosing his time of sailing by one of the Peninsular and Oriental Company's steamers, as to be able to see the best spots on the south coasts of Spain and Portugal, Gibraltar, and Malta. This arrangement will usually be preferable to that of beginning the voyage at Marseilles. From Malta to Alexandria occupies only a few days: the traveller ought to arrive at the latter by the middle of November. Leaving this port as soon as "the Sights" are visited, he proceeds to Cairo by railway; whence he begins to ascend the Nile, so as to reach Thebes by the beginning of December. The climate of Thebes is all that the valetudinarian can desire; and hence he may either remain there, or proceed southerly in the direction of Nubia. But, however far his trip may extend, he should be back in Cairo by the end of March; whence he may arrange his home journey, by way of Greece and Constantinople, so as to be in England by about the latter part of June.

The necessity for travelling by, and living in boats after leaving Cairo, has of course certain disadvantages, and is somewhat expensive. But with a dry balmy atmosphere, and a sky bright and cloudless, the invalid may find much that is most agreeable and exhilarating in the even progress of a Nile boat—a dahabeëh. The two chief annoyances to the traveller in Egypt are the dust, and "Baksheesh." The former may be mitigated by suitable clothing—mohair dresses for ladies, and flannel shirts with tweed suits for gentlemen; while the latter must be avoided by not exhibiting too much liberality, and by bargaining beforehand with dragomen, guides, coachmen, boatmen, &c. The diet should be simple and unstimulating, but nourishing: light Hungarian or Bordeaux or Rhine wines are preferable to port and sherry and brandy. Bitter beer is often serviceable; but stout and porter should be avoided. Purgatives ought to be taken as seldom as possible. Cod liver oil often disagrees; while all preparations of bark are more than ordinarily apt to produce headache and hepatic derangement. The climate may especially be recommended in the early stages of tuberculosis, except in cases in which there is a dry irritable cough, in chronic bronchitis, in clergyman's sore throat, tertiary syphilis, some forms of asthma, gout and rheumatism, renal diseases, dyspepsia, and affecitons of the nervous system.

451. *Algiers.*

The city of Algiers, the capital of an extensive country of northern Africa, bordering on the Mediterranean, has been much resorted to by invalids. It can be reached easily in seven or eight days from London; by way of Folkestone, Paris, Lyons, Marseilles, and thence by steamer in forty-eight hours. About the end of October is the best time for the invalid's arrival on the coast of Africa; the great heat having then usually ceased, and the first rains having refreshed the lands, so that the country has the appearance of spring.

Speaking of this city, DR. MITCHELL says that with difficulty, if at all, will the European traveller find a spot on earth where natural beauties so combine with those of man's creation to please and interest him. One of the long sides of the oblong of which the "Place du Gouvernement" is formed, is open to the sea; commanding a view of the bay, the harbour, the peaks of the distant Atlas, and the verdure of the Sahel slopes. The "Place" itself is filled with a strange mixture of all races; the Arab, the Moor, the turbaned Jew of Africa, the Maltese fisherman, the Spanish fruitseller, the veiled women of Moslem, the picturesque Jewess, the pretty Spaniard, &c. &c. The invalid will find objects of interest without seeking them, and will be gratified and amused merely by wandering in the open air.—The mean annual temperature is about 66·50° Fahr. The mean temperature for each season is—winter, 56·91; spring, 67·60; summer, 77·73; and autumn, 63·80. The rainfall is 36 inches: rainy days, 96. Winter fogs are rare. Snow has fallen once in seven years. Compared with other points on the Mediterranean, Algiers has a warmer and a less varying climate than Marseilles, Nice, Genoa, and Naples; while it more nearly approaches, but is still superior to Malta, Corfu, and Gibraltar.—DR. MITCHELL quotes the opinions of M. ODRULTZ, which are to the following effect:— 1st, The climate of Algiers is opposed to the generation as well as to the evolution of tubercle in the lungs: 2nd, This morbid production is observed but very exceptionally among the indigenous population: 3rd, Europeans who do not bring the germ of the disease to Algiers, almost never become phthisical: 4th, Those who do bring not only a predisposition, but actually crude tubercle, in greater or less quantity, in the lung, are often cured; or, in the worst cases, the progress is extremely slow: 5th, When the tubercle has softened, the climate is no longer favourable, but the reverse.

The climate is also beneficial in laryngeal and bronchial affections; in chronic heart disease; in gout and rheumatism; and in renal disorders.—Nervous complaints, paralysis, epilepsy, and convulsions are aggravated by it. Cerebral congestions, gastric and hepatic disturbances, and a plethoric condition of the uterine organs, appear to be common in Algiers.

Tangiers possesses a climate equal to that of Algiers, and is gradually becoming available as a winter residence for invalids.

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452. *The Azores—Madeira—Canaries.*

THE AZORES OR WESTERN ISLES.—This group of nine islands belonging to Portugal, lies in the midst of the Atlantic Ocean. They are of volcanic origin, all possess similar features, and all have mild equable climates. The atmosphere is saturated with moisture. A winter trip to the Azores may be recommended where a soothing relaxing climate is needed. Hence it is beneficial in inflammatory dyspepsia, bronchial irritation with scanty secretion, and in the premonitory stage of consumption. SIR JAMES CLARK thinks that a change from the Azores to Madeira, and from thence to Teneriffe, would in many cases prove more beneficial than a residence during the whole winter in any one of these islands.

MADEIRA.—Of the group of Madeira Isles, the largest and most important is Madeira, about 120 miles in circumference. Funchal, its capital, has long enjoyed great reputation as a winter residence for the phthisical. It is almost certain that this reputation is now undeserved. Where the disease is advanced and the irritable lungs are soothed by a humid heat, some of the distressing symptoms of phthisis are alleviated by a stay at Funchal; but such relief does not stay the increase and degeneration of tubercle. The invalid who leaves this country about the middle of October, can reach Madeira in from ten to fourteen days; where he will find himself in a tropical climate, with an unclouded sky, a glowing sun, a deep blue sea, a luxuriant and varied foliage, and beautiful hills which were covered with flourishing vineyards. Since the autumn of 1852, however, when the vine disease suddenly broke out, there has been a sad change; the plants still being destroyed by the deadly fungus.—The return voyage should be undertaken about the beginning of June.

The climate of Madeira is mild, equable, and moist. There are occasional storms of wind and rain, and fires are often necessary in the mornings and evenings. The mean annual temperature is 64·9°; that for winter being 60·6, spring 62·3, summer 69·5, and autumn 67·3. The annual rainfall is 29·23 inches; the days on which there is wet being about 70, whereas in London they number 178. The most injurious wind is the hot parching leste, from the east-south-east; which is often charged with a fine dust, very irritating to the air passages.

The invalid who cannot bear a dry and irritating climate, but needs a mild and soft and relaxing atmosphere, will obtain it here. Laryngeal, bronchial, and pulmonary diseases are soothed; and benefit may be derived by a few patients threatened with consumption, provided their symptoms are marked by irritability and an excess of vascular action. Hypochondriacal and rheumatic and neuralgic patients ought especially to avoid Madeira. Should the invalid wish to spend a second winter in Madeira before returning home, a voyage may be taken to Teneriffe in June, and the stay prolonged there until the end of October.

THE CANARY ISLANDS.—This group (Fortunatæ Insulæ) consists of seven principal islands, and several islets. The climate differs from that of the foregoing in being warmer, drier, and less relaxing. At *Santa Cruz*, the capital of *Teneriffe* (the only island possessing good accommodation for the valetudinarian), the mean annual temperature is 70·15°: that for winter being 64·85, spring 68·87, summer 76·68, and autumn 74·17.—Orotava and Laguna are sometimes preferred to Santa Cruz.

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453. *Cape of Good Hope—Natal.*

THE CAPE OF GOOD HOPE.—The climate is mild and healthy but very dry. The seasons are the reverse of those in Europe; December and January being the warmest, while June and July are the coldest months. The mean temperature for the winter months of 1858, at Cape Town, was 57° Fahr. The prevalent diseases appear to be rheumatism and dysentery. Invalids from India are often benefited by spending a season at the Cape or at Natal.

NATAL.—This British Colony lies on the south-eastern border of Africa, about 800 miles from the Cape of Good Hope. There may be said to be only two seasons,—the summer from October to March, and the winter from the beginning of April to the end of September. Even in the latter, during the coldest months of 1858, the temperature was occasionally 78° Fahr. in the neighbourhood of Maritzburgh; while in the hottest months it was occasionally below 60°. (*The Colony of Natal.* By Robert J. Mann, M.D., p. 48, London, 1860.) Notwithstanding its almost tropical position, and the frequent vicissitudes of temperature, Natal is very healthy. DR. MANN remarks that while 480 soldiers die yearly out of every 1000 stationed at Sierra Leone, 121 in 1000 at Jamaica, 78 in 1000 at the West Indies generally, 48 in 1000 in the Madras Presidency, 28 in 1000 at Bermuda, 27 in 1000 in the Mauritius, 25 in 1000 at St. Helena, 21 in 1000 at Gibraltar, 16 in 1000 at Malta and Canada, and 14 in every 1000 in Nova Scotia and New Brunswick,—only 13 in 1000 die yearly in the western districts of the Cape Colony, and only 9 in 1000 in the eastern district. During the Kafir war in 1835, not a single officer or man was invalided during the five months of active service. Newly arrived settlers in Natal, remain for months under canvas, without the slightest injury.

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454. *Canada—New Brunswick—Nova Scotia—Newfoundland.*

CANADA.—This British Colony of North America is divided by the Ottawa river into the provinces of Upper or West Canada (chief city, Toronto) and Lower or East Canada (chief city, Quebec). The climate is marked by extremes, the winters being excessively cold, while the summers are just as hot. The coldness of the winter is mitigated, however, by the dryness of the air and the absence of high winds; while the way in which the Canadian protects himself with thick furs, and his house by well managed stoves, enables him to set the frost at defiance. A gentleman, resident in Canada for six years, told the Author that with the thermometer −20° he never felt the cold so raw and unpleasant, as in London at the beginning of January, 1864.—The climate is also much milder in Upper than Lower Canada; but that of both provinces is healthy and conducive to longevity.

NEW BRUNSWICK.—The climate of this portion of British North America resembles that of Canada; the winters being very severe and the summers excessively hot. The winter, however, is mitigated by the length and fineness of the autumn,—the "Indian summer."

NOVA SCOTIA.—This peninsula of North America, forming part of the British colonial territory, is separated from New Brunswick by an isthmus 14 miles across. The climate is remarkable for vicissitudes of temperature, prolonged falls of rain, and occasional fogs. The inhabitants, nevertheless, are said to enjoy a remarkable degree of health.

NEWFOUNDLAND.—This island, lying off the coast of Labrador, is separated from the mainland by the Strait of Belleisle, which is 12 miles across. The surface of the island is mostly marshy, and the soil unfavourable to cultivation. The winters are less severe than in Upper Canada, but the summers are shorter. Dense fogs prevail along its banks, sometimes for the greater part of the summer. The annual mortality, however, scarcely exceeds 12 per 1000 of the population, so that the climate must be favourable to the constitution.

455. *West Indian Islands.*

Invalids should not be sent to any of these islands; for though they are not as unhealthy as was formerly supposed, yet severe fevers and inflammatory diseases are common and run a rapid course. Moreover, the returns show that nearly twice as many cases of consumption originate among our troops stationed here, as at home. If a man in search of health will visit them, however, he must only do so between the months of December and April, after the heavy autumnal rains. JAMAICA, the chief of the British possessions, is reputed the most healthy. The BAHAMAS are resorted to by American invalids. In the BERMUDAS and in BARBADOES, dysentery, rheumatism, and yellow fever are the prevailing diseases.

456. *Hill and Marine Sanitaria in India.*

The Indian *hill stations* offer a climate which is of great use to convalescents from fever, invalids from local cachexia, &c.; and which exerts a powerful influence in maintaining the health and vigour of Europeans—especially of such as have not been very long in India.

According to DR. W. J. MOORE, of the Bombay Medical Service, the climate of the hill ranges differs from that of the plains in having a mean temperature some 10° to 15° cooler, in being above the influence of the hot winds, and in being more humid during the monsoon season. Various localities differ in minor points: in the *Himalayas*, a greater elevation will procure a colder climate; the fall of rain has sometimes been excessive at *Mahableshwar*, at *Nynee Tal*, &c.; while at many of the hill stations sanitary laws are still too much disregarded, and too little care is taken to protect the system from the inclemencies of the weather.

The climate of the hill stations in the *Himalayas*, of *Mount Aboo*, of *Ootocamund*, *Bangalore*, &c., as well as of *Matheran* and *Mahableshwar* in *Bombay*, is of great service to the European whose health has deteriorated from a residence on the Indian plains. The air invigorates both mind and body. But it is unsuitable where there is structural disease of any internal organ; diarrhœa and dysentery being increased by it, while affections of the brain and lungs and liver are much aggravated. Cholera, dysentery, and malarious fevers are less prevalent and fatal in the hill stations than in the plains below. Yet these affections are met with at high elevations; as are also cases of hepatitis, tuberculosis, typhus. croup, diphtheria, small-pox, rheumatism, neuralgia, severe catarrh, and hill-diarrhœa.—It has been well suggested that European troops should be located more on the hills and less on the plains than is now the case; not waiting until they are weakened by disease, climate, and service to be sent to these more temperate and less malarious regions.

Many of the diseases which are aggravated by the hill stations of India, are much benefited by the greater purity and uniformity of the *sea climates*. The invalid who has been prostrated by the harsh parching winds of the interior, not only has his bodily sufferings greatly ameliorated by the moist fresh breeze from the sea, but the mere sight of the ocean raises his powers by giving him hope and confidence. It is necessary to select an open spot, with high cliffs and a rocky shore; low, flat, sandy coasts being generally unhealthy in the tropics. The proximity of the island of *Martaban* to Madras and Calcutta, as well as its geological characteristics, have led DR. MACPHERSON to recommend it as a marine sanitarium.

The weak-chested, and those persons of a strumous habit predisposed to phthisis, are often greatly benefited by a residence in India; but where tubercle is deposited in the lungs, the climate seems to accelerate the progress of the disease. Individuals of a phlegmatic temperament who have more or less difficulty in digesting their food, and who possess a languid circulation, often improve very much in this country.

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457. *Australia—Tasmania—New Zealand.*

AUSTRALIA.—The immense extent of territory known as Australia, in the South Pacific Ocean possesses a temperate climate which appears very favourable to the European constitution. In speaking of this antipodal region it is necessary to remember that the meteorological phenomena are generally the reverse of those experienced in this country. Thus the months of December, January, and February correspond to our summer, and have a mean temperature of about 80°; while those of June, July, and August constitute the winter, the thermometer marking on an average 40° in an exposed situation.

In May, 1836, the number of settlers in the district of *Victoria* (formerly Port Philip), was 177. At the end of a quarter of a century (April, 1861), the amount had increased to 540,322. The total area of Victoria (86,831 miles) is nearly as large as that of England, Scotland, and Wales united. *Melbourne*, the capital of Victoria, is the most prosperous commercial city of the southern world. The mean annual temperature is 57°; extreme cold in winter, and excessive heat in summer (except nine or ten times in the season, under the influence of hot winds), being unknown. Although the annual rainfall is 26 inches (that for London being 21·6), yet the average number of wet days is much less than in Great Britain; for in Melbourne the rain falls with great violence, but it only lasts a few hours, and then the sky clears. A continuance of cloudy weather is unknown. There is a genial sun; with a pure, dry, stimulating air.

DR. S. DOUGAN BIRD says (*Australasian Climates, and their Influence in Pulmonary Consumption*, p. 41, London, 1863), that the main characteristics of the Victorian climate are these:—"It is a temperate warm climate, whose average summer heat is but two or three degrees above that of London; while in winter it is warmer than Nice or Naples, and as warm as Valencia or Barcelona; and actual cold is never felt at, or near, the sea level. The air is generally dry, always stimulating and ozoniferous; but so tempered by the prevalence of ocean winds, that it is prevented from becoming irritating, like that of Nice or Provence. With this there is a very large proportion of sunny cheerful weather during the whole year. In no climate with which I am acquainted is there so much pleasant weather during the year as in Victoria—so many unclouded days, when it is neither too hot nor too cold—and an invalid has, consequently, every temptation to be in the open air."

Tuberculosis (*i. e.*, scrofula, phthisis, tabes mesenterica, and tubercular meningitis) is rare in Victoria, the mortality not being one-fourth of that in Great Britain from the same cause. Yet the population is composed of those who, hereditarily, from occupation and mode of living (except that animal food is much cheaper), are as much predisposed to consumption as the inhabitants of London or Liverpool. It should be added that these statements have been controverted, and that phthisis has been shown to be more common than is here allowed, but there can be no doubt that the climate is exceptionally healthy.

At *Sydney* (the capital of New South Wales, East Australia) the mean annual temperature is about 65°. Heavy rains fall between June and September. Disease is said to assume a milder form here than in European countries. Dysentery and pulmonary affections are, however, not uncommon. The winters are colder than at Moreton Bay, though this season is very salubrious and agreeable.

Moreton Bay (Queensland, East Australia) has a fine winter climate which proves very useful in advanced cases of phthisis, when combined with irritability of the system and a tendency to bronchial inflammation. The average temperature on the coast during the cold months is 62° or 63; the air being soft and sedative, and the weather brilliant and sunny. A few miles inland the ground rises, and the air is more dry and bracing.

In cases of consumption with copious expectoration, and in the chronic bronchitis of old people, *Adelaide*, the chief city of South Australia, may be chosen as a residence. The air is dry, warm, and tonic; the winter temperature averaging 53°.

The invalid leaving England for Australia, will generally find the long uninterrupted voyage round the Cape of Good Hope, in a comfortable ship, much to be preferred to the more exciting and fatiguing "overland route," by way of Suez and Galle. The best time for leaving this country is from the middle of October to the end of November; when the new home will be reached in about 90 days from Liverpool. Thus supposing the traveller to arrive about the end of January he will find a pale-blue cloudless sky, and the thermometer at 90° in the middle of the day without any unpleasant sense of heat. With a feeling of new life, general exhilaration, and a good appetite, he will experience a desire to be at work. The difficulty seems to be to persuade the phthisical that they are not cured; and that the general rules of hygiène must be adopted, and all excesses avoided, to prevent the pulmonary mischief again starting into activity, or to escape hepatic congestion, or that he may obtain and retain health and vigour.

TASMANIA.—This island (known as Van Diemen's Land) until the abandonment of transportation in 1852) is separated from the southernmost point of Australia by Bass's Strait. The chief towns are *Hobart Town* in the south, and *Launceston* in the north; the climate of both being salubrious and delightful, and highly conducive to longevity. The latter port is reached in twenty-four hours, by steamer from Melbourne, and is beneficial to such cases as are usually sent to Pau. The air is moist, sedative, and equable. In the winter months of June, July, and August there is never great cold during the day. The mean annual temperature of Hobart Town is 52° Tasmania is described as "the Garden of Australia."

NEW ZEALAND.—This group in the South Pacific Ocean, consists of two principal (the North and Middle) and several smaller islands. The chief British settlements are *Auckland*, *New Plymouth*, or *Tarauki*, *Hawkes Bay*, and *Wellington* in the North Island; with *Nelson*, *Marlborough*, *Canterbury*, and *Otago* in the Middle Island. The temperature of New Zealand is marked by its uniformity. The mean of the warmest month at Auckland is 68°, and of the coldest at Otago 42°. The climate, which in general terms may be described as mild and soft, appears to be favourable to the European constitution.

XXI. MINERAL WATERS.

458. *General Observations.*

Mineral waters have been used in medical practice since the days when ÆSCULAPIUS was worshipped throughout Greece, and when his temples were erected in healthy places, near wells which were believed to have healing powers. Like many other important remedies their virtues have been regarded with singular scepticism at one time, and with blind credulity at another. The practitioner in the present day wisely attempts to keep the middle course; neither over-estimating, nor unduly depreciating, the value of these agents in subduing disease.

A mineral water is merely a complicated medicine, containing various salts and gases blended together. The ingredients are generally derived from the soil or rocks through which the waters pass; and they consist especially of chloride of sodium, sulphate and carbonate of soda, sulphate and carbonate of magnesia, some salt of iron, carbonate of iron, bromine and iodine, organic matters (barègine), and more or less of a free gas (sulphuretted hydrogen, carbonic acid. nitrogen, or oxygen). The cause of the temperature of hot springs is a mystery; and philosophers know not whether it is due to the internal heat of the globe, to electricity, to chemical decomposition, or to volcanic agency. The heat is generally much under that of boiling water, and in most springs it is found to have varied but little during a long succession of years. The only waters which have a temperature as high as 212° Fahr. are the geysers or hot springs of Iceland.

Mineral waters are administered internally and applied externally. They act chiefly by diluting and purifying the blood; increasing the processes of secretion and excretion, so that morbid matters are eliminated from the system. They likewise stimulate the cutaneous and visceral circulation. It cannot be doubted that these effects are in some measure due to the chemical composition and temperature of the waters; though it is allowed on all hands that the beneficial influence is largely aided by the locality of the spring, the nature of the climate, the absence of business and care, the diet, and the general regimen.

Mineral waters are useful only in chronic disorders, where there is but little, if any, structural change; or in cases where disease is threatened. Hence the sufferers sent to the Spas are for the most part affected with skin affections, strumous and other rebellious ulcers, stiffness of joints and limbs from old sprains, &c.; chronic gout, rheumatism, sciatica, or neuralgia; gastric, hepatic, or renal disorders; sluggish action of the intestines, particularly of the colon and rectum; paralytic affections, where all active disease has been subdued; hysteria or hypochondriasis; or with certain functional disorders of the uterine system. Nothing but mischief can arise where there is either acute disease, tuberculosis, cancer, fatty degeneration of any important structure, aneurism, or mischief about the heart or large vessels. Where there is any predisposition to cerebral, pulmonary, gastric, or intestinal hæmorrhage all thermal mineral waters (especially in the form of baths) are contra-indicated. The young and the very aged, moreover, will derive little or no benefit: and in pregnancy the use of the springs, to say the least, demands great caution.

The time for residing at some of the Spas is from the beginning of May unti about the close of September; but at several of the foreign ones it is only from June until the end of August. At a few of the hot springs, invalids (chiefly the gouty) remain through the winter. The treatment, however, is not commonly to be prolonged beyond six or eight weeks; and often three or four will suffice. The invalid should not be led to expect immediate relief. And he should be cautioned against the popular idea that the benefit derived will be in proportion to the quantity of water taken; while it may be as well to let him know that "critical eruptions" (psydracia thermalis), and "critical fluxes" are neither necessary nor advantageous. As a rule, bathing and drinking ought not to be commenced on the same day; and at first only a moderate quantity of the water should be taken,—two or three of the ordinary glasses before breakfast, and one or two in the evening. After a time, a glassful may also be taken before dinner. Very hot water is to be cooled, and very cold to be warmed, before drinking.

When the strength will permit of it, early rising (at about 6 o'clock) is to be recommended, so that the doses may be taken before breakfast. The contents of the tumbler are to be sipped slowly and methodically, not hastily swallowed like a nauseous draught; and an interval of 15 minutes, at least, should be allowed between each glass, which time may well be spent in a short walk. An hour after the last glass, a light breakfast is to be taken. Then a gentle saunter, the bath, reading, writing letters, &c., will agreeably occupy the hours till the early dinner; at which fruit and raw vegetables had better be avoided, while a moderate quantity of light wine, or of mild bitter beer can be permitted. An excursion to the objects of interest in the neighbourhood, perhaps one or two more glasses of water—never more than half the quantity taken in the morning, a light supper at 8 o'clock, and bed two hours afterwards will complete the day's work.

Mineral waters are sometimes classified into the thermal or hot, and the cold springs. But a more useful division is into chalybeate, sulphurous, gaseous or acidulous, saline, iodo-bromated, and muriated lithia waters.

Class 1. *Chalybeate or Ferruginous Waters.*—A large number of waters contain small quantities of iron, but none are considered as belonging to this class unless the proportion of metal is considerable. The chief acidulous chalybeates (those which contain much carbonic acid gas) are the waters of Schwalbach, Spa, Pyrmont, Brückenau, the Cambray well at Cheltenham, and Tunbridge Wells. The principal saline acidulous chalybeates (such as, in addition to iron and carbonic acid, have a certain amount of sulphate and carbonate of soda, with chloride of sodium) are the springs of Frazensbad, Bocklet, Harrogate, &c.—Chalybeate waters are useful in anæmia, and in functional disorders of the generative organs

Class 2. *Sulphurous Waters.*—They have the odour of rotten eggs owing to their impregnation with sulphuretted hydrogen. The chief sulphurous thermals are those of Aix-la-Chapelle, Baden near Vienna, Aix-les-bains, Barèges, Bagnères de Luchon, St. Sauveur, Cauterets, Eaux-Bonnes, and Eaux-Chaudes: the higher the temperature, the more stimulating the effect of the water on the nervous and vascular and cutaneous systems. Amongst the cold sulphurous springs may be mentioned Harrogate and Bocklet.—Sulphurous waters are recommended in cutaneous, hepatic, uterine, rheumatic, gouty, neuralgic, and old constitutional syphilitic diseases. In chronic poisoning by mercury, lead, or copper they help to eliminate the injurious mineral. The excretion of carbonic acid by the lungs and skin, as well as of urea and uric acid by the kidneys, is probably increased by these waters.

Class 3. *Gaseous or Acidulous Waters.*—The carbonic acid gas gives these waters a sharp acidulous taste, with a sparkling appearance. The most important are the thermal springs of Vichy, and the cold of Fachingen and Bilin. The refreshing and exhilarating waters of this class are recommended in dyspepsia, hepatic derangement, gout and rheumatism, &c.

Class 4. *Saline Waters.*—Those which are purgative and have sulphate of soda or sulphate of magnesia as their chief ingredients, are Epsom, Cheltenham, Leamington, Seidlitz, Püllna, Carlsbad, and Marienbad. They are useful in habitual constipation, torpidity of the liver, inactivity of the abdominal viscera generally, chronic rheumatism, sciatica, and perhaps in diabetes (Carlsbad especially). Those saline waters which have chloride of sodium as their characteristic ingredient, are Wiesbaden, Baden-Baden, Homburg, Kissingen, &c. They are employed in cases of scrofula, rheumatism, dyspepsia from overwork, and irregularity of the bowels. The sulphate or carbonate of lime, or both, predominate in the thermal waters of Bath and Buxton; while the carbonate or bicarbonate of soda is the characteristic ingredient of the thermal springs at Ems, Teplitz, &c.

Class 5. *Iodo-bromated Waters.*—The springs at Kreuznach are the most celebrated of this class; while in England there is the Woodhall spa. The waters are used in all forms of scrofula, in many chronic skin diseases, in uterine tumours, and in old-standing constitutional syphilis.

Class 6. *Muriated Lithia Waters.*—The springs of Baden-Baden have considerable reputation for the cure of gout and the uric acid diathesis, owing to the chloride of lithium which they contain.

459. *Tunbridge Wells, in Kent and Sussex.*

This town is more visited on account of its dry bracing air, beautiful varied scenery, and fine walks, than for its chalybeate spa. The water of the latter has a temperature of 50°, is feebly ferruginous to the taste, contains about a quarter of a grain of *oxide of iron* to the pint, and has just sufficient *carbonic acid* to hold the metal in solution. Frequently increased doses of steel are given with the water; or sulphate of magnesia may be added, if an aperient be needed. The chief value of the spring is witnessed in cases of anæmia and chlorosis, debility inducing dyspepsia, and in general lassitude from a too sedentary mode of life.

460. *Bath, in Somersetshire.*

The thermal mineral springs, situated in the southern part of the town, near the Abbey church, are four in number. The temperature of the waters varies from 120° Fahr. to 104°. Speaking generally the solid contents are about ten grains to the pint. The chief constituents are *sulphate of lime*, *sulphate of soda*, *chloride of sodium*, *chloride of magnesium*, *carbonate of lime*, *silicic acid*, and a comparatively small portion of *iron*. The gases evolved consist of *nitrogen* in large quantity, with *oxygen* and *carbonic acid*.

The sparkling appearance of the waters at the springs is due to the carbonic acid they contain. The quantity generally drunk is from one quarter to one pint, before breakfast and again in the afternoon. Taken quietly and leisurely the effect is usually to raise the temperature of the body, to quicken the circulation, to increase the appetite, and to promote the salivary and renal secretions. When headache, loss of appetite, thirst, nausea, mental depression, and a diminished flow of urine follow their use, they should either be discontinued or taken in very small doses.

The accommodation for bathing is excellent; there being good douche, shower, vapour, reclining, swimming, and chair baths. By the latter, worked with a crane, a helpless invalid is lowered into, and raised from, the water. The bath is to be taken three or four times a week, not too near the meal times, and the patient should remain in it from ten to thirty minutes. The proper temperature is 96° to 98° Fahr.

The spring and autumn are the best seasons for taking the baths and waters, though they may be advantageously employed in the winter. And the diseases which are most benefited by them are subacute gout, chronic rheumatism, sciatica, neuralgia, lumbago, rheumatoid arthritis, contracted or rigid joints, dyspepsia, paralysis from rheumatism or metallic poisoning, leucorrhœa, chorea, anæmia, lepra, eczema, and psoriasis.

461. *Cheltenham, in Gloucestershire.*

Since the cure of George the Third by the waters of the Royal Old Wells, this Spa has been a fashionable resort. Situated 8 miles E.N.E. of Gloucester, Cheltenham offers an agreeable permanent residence, particularly for valetudinarians from the East or West Indies. The climate in winter is mild and equable, but rather moist. The town is sheltered by the Cotswold and other hills from the north and east winds. The season lasts from about the middle of April to the beginning of October.

The waters are chiefly taken internally. There are several cold springs, all of them powerfully saline except the Cambray Chalybeate. The waters of the Royal Old Wells contain chiefly *chloride of sodium*, *chloride of calcium*, *chloride of magnesium*, and *sulphate of soda*. They are but slightly gaseous. Some of the wells of the Montpellier Spa have, in addition to the foregoing, a little *oxide of iron*, and *ioduretted magnesium saline salts*. There is an unusual amount of *silica* in the Pittville saline; while the Cambray spring is strongly *chalybeate*. The Montpellier baths have accommodation for warm and cold bathing, swimming, medicated air, and vapour douches, &c.

These springs enjoy considerable reputation for relieving the diseases engendered by a residence in tropical climates, and hence many old Indians with liver affections resort to them. They are also useful in gouty and rheumatic disorders, in the lithic acid diathesis, in plethoric and irritable systems, in skin diseases, in dyspepsia with torpidity of the bowels, as well as in some forms of amenorrhœa and chlorosis. The dose is usually from half a pint to one pint before breakfast; it is better to take the water pure, without the addition of any "solution" of the crystallized salts; and it may be warmed if a more than ordinary aperient effect is needed. The spring to be recommended must depend upon whether a simply alterative, or an alterative and tonic remedy be indicated.

462. *Purton and Melksham, in Wiltshire.*

The healthy village of PURTON in North Wilts, 4½ miles W.N.W. of Swindon, has a dry bracing air. The Spa is 2½ miles from the village, in a field known as Salt's Hole, where a pump-room has recently (1859) been erected for the accommodation of visitors. An analysis of the water shows that it is rich in *sulphate of soda*, *sulphate of magnesia*, *sulphate of lime*, *carbonate of potash*, and *chloride of sodium*. There are also small quantities of *sulphate of potash*, *silica*, *iodide of sodium*, and *bromide of magnesium;* with traces of *iron*, *phosphoric acid*, and *sulphuretted hydrogen*. There is a large amount of free *carbonic acid gas;* and the temperature is 58·50°.

The Purton sulphated and bromo-iodated saline water can be recommended where an alterative stimulant is needed. It seems to have been useful in strumous sores and enlarged glands, threatened consumption, stomach and liver disorders, gouty and rheumatic affections, obstinate skin diseases, as well as in functional derangements of the uterine system. The dose is from half a pint to a pint before breakfast, with half a pint in the evening.

The small town of MELKSHAM lies 10 miles E.S.E. of Bath, in a fine open country. In its vicinity are baths and a pump-room erected over the chalybeate and saline springs. The chief constituents of the waters are the salts of *lime* and *magnesia*, with smaller portions of *soda* and *iron;* and they are artificially charged with gas for exportation. In strumous, rheumatic, and cutaneous diseases, the medicated vapour and douche baths may be employed simultaneously with the internal use of the waters.

463. *Leamington, in Warwickshire.*

Being less protected by hills than Cheltenham, the town of Leamington, 2½ miles E. of Warwick, has a lower temperature. The climate however, is genial and bracing, but humid; while it is agreeable and healthy to the flagging invalid during the autumn and winter months.

The springs all lie near the banks of the Leam; their principal salts being,—*chloride of sodium*, *sulphate of soda*, *chloride of calcium*, and *chloride of magnesium*. The chief gas is *carbonic acid*, with great quantities of *nitrogen* and *oxygen*. The most ancient and most used of the springs is the OLD WELL. The water at GOOLD'S SPRING AND BATHS contains more *chloride of sodium*, while CURTIS'S WELL has more *chloride of magnesium* than the others. The VICTORIA WELL AND PUMP-ROOM possesses a weak *sulphurous* and a *saline chalybeate* spring; and so does LEE'S WELL.

The temperature of the Leamington waters is about 48° Fahr.; and their action is aperient and alterative. They are suitable for the same class of cases as is sent to the Cheltenham springs; but being more active they agree better with invalids of a torpid habit, than with those of a susceptible irritable temperament.

464. *Buxton, in Derbyshire.*

For invalids requiring mountain air Buxton may be recommended. Situated 31 miles W.N.W. of Derby, at an elevation of 900 feet, while some of the neighbouring hills are 2000 feet above the sea, it enjoys a pure bracing air. Like all mountain districts the climate of Buxton is subject to sudden variations of temperature. The rainfall is rather great; but owing to the absorbent nature of the soil the ground rapidly dries. The season is chiefly from June to October; the winds being sharp and cold late in the autumn, during winter, and early in the spring. Buxton is not to be selected where there is a tendency to internal hæmorrhage.

The Buxton waters issue abundantly from several crevices in the limestone rock at a temperature of 82° Fahr. The chief saline salts in them are, *carbonate of lime*, *carbonate of magnesia*, *chloride of sodium* and *calcium* and *potassium*, with *silica*, *carbonate of protoxide of iron*, and traces of *fluoride of calcium* and *phosphate of lime:* though so small is the quantity, that in the whole, they only amount to 18·434 grains in the imperial gallon. In the same amount of water Dr. Playfair found (1852) *free carbonic acid*, in weight 704·2 grains, *nitrogen gas* 206 cubic inches, and *carbonic acid gas* 15·66 cubic inches. According to the most recent analysis by Dr. Sheridan Muspratt (1860) the quantity of *nitrogen gas*, at the moment of issue, is no less than 504 cubic inches per gallon.—As these waters, minus their gases, have only the composition of ordinary spring water, their stimulating effects are generally attributed to the nitrogen. They are, however, chiefly used externally; the accommodation for plunge, swimming, and douche baths being excellent. The good which results from the latter is most marked in cases of gout and rheumatism, in severe sprains and old muscular contractions, as well as in cases where it is wished to stimulate the vascular or nervous or digestive systems.

A pleasant drive from Buxton is the picturesque village of Matlock, built on the slope of a hill, at the base of which flows the Derwent. It is an agreeable summer residence, and its springs supply large tepid baths. The water, however, has no medicinal properties, though the guidebooks usually describe Matlock as a valuable Spa.

465. *Woodhall, in Lincolnshire.*

This strong saline spring arises in a plain 3 miles W.S.W. of Horncastle, and contains more *iodine* and *bromine* than any other English water. It has also 189 grains of *chloride of sodium* in the pint, with a little *chloride of calcium* and *magnesium*, *bicarbonate of soda*, and *sulphate of soda*. The temperature is 55°. The water is chiefly used externally in rheumatic and cutaneous affections, and in scrofula. Taken internally half a pint acts as a mild aperient.

466. *Harrogate, in Yorkshire.*

High and Low Harrogate, half a mile distant from each other, and 27 miles W. of York, are filled with visitors during the season,—from June until the middle of October. The air is pure and bracing, but somewhat humid. The soil is sandy, so that the walks are soon dry even after heavy rain. Low Harrogate is the most sheltered. The most elevated part of High Harrogate is 596 feet above the sea.

There are upwards of fifty different springs, some of which have been in repute since the end of the 17th century. The waters are all cold, being generally warmed artificially before they are drunk. Dr. Kennion divides the springs into four distinct groups:—(1) The strong sulphurous waters. (2) The mild sulphurous waters with alkaline impregnations. (3) The saline chalybeate waters. And (4) The pure chalybeate waters.

1. Strong Sulphurous Springs.—As types of this class may be mentioned the old Sulphur Well in the Royal Pump Room, and the strong Montpelier Sulphur Well in the Montpelier Gardens. They are both impregnated with *sulphuretted hydrogen gas* (upwards of 25 cubic inches in the gallon); their chief salts being *chlorides of sodium* and *calcium* and *potassium* and *magnesium*, *sulphide of sodium* and *carbonate of lime*, with traces of *bromide of sodium*, *iodide of sodium*, &c. The waters are alterative, aperient, stimulant, and diuretic: they are taken internally, and used as baths. The dose varies from half a pint to a pint and a half, in three or four divided quantities before breakfast.

2. Mild Sulphurous Springs with Alkaline Impregnations.—The two most important are the Mild Montpelier Well, and the spring at the Victoria Gardens. They contain much less *sulphuretted hydrogen*, less *chloride of sodium*, and less *chloride of magnesium* than those of the preceding group; but they have in addition *carbonate of magnesia*. They are antacid, alterative, diuretic and deobstruent; and are used externally as well as internally.

3. Saline Chalybeate Waters.—One of these springs is in the Cheltenham Pump Room, the other in the Montpelier Gardens. In addition to the salts already mentioned they contain *carbonate of iron*, so that they have a tonic action superadded to their other properties.

4. PURE CHALYBEATE WATERS.—The springs of the Tewit and St. John's Well, have almost the composition of pure water, with the addition of a small quantity of *carbonate of iron.*

Invalids with all forms of chronic disease visit Harrogate to drink the waters. But the cases most likely to derive benefit are the following :—Imperfect digestion in men too fond of good living, where the bowels and liver are inactive ; habitual constipation ; obesity ; indurations and chronic swellings of the glands, joints, &c. (the strong sulphur springs) : chronic skin diseases, such as eczema, lepra, impetigo, acne, pityriasis, lichen, &c. (the sulphur, beginning with the mild) : gouty and rheumatic affections (the strong sulphur) : threatened phthisis, especially in young women with disordered menstruation (the mild sulphur, alternately with pure chalybeate) : strumous affections (the saline chalybeate) : and lupus, constitutional syphilis, chronic ulcers, &c. Very frequently great advantage is derived from the external use of the strong sulphur waters, combined with the internal administration of the chalybeate.

467. *Spa, in Belgium.*

Situated near the frontier of Rhenish Prussia, in the beautiful valley of the Ardennes, at the foot of a steep mountain sheltering it from the north winds, is Spa. It possesses the only important mineral springs found in Belgium. The waters of the principal well—the Pouhon—have a temperature of 50° Fahr., and are largely charged with carbonic acid ; the chief solid constituents being the *bicarbonates of soda, iron, lime*, and *magnesia.* Spa is rather more than 1000 feet above the sea level.

The wells of the Sauvenière, Groesbeck, Géronstère, and the three Tonnelets are situated at short distances from the town. Their waters are similar to those of the Pouhon, but the proportion of iron is smaller. The Tonnelet springs are the most gaseous. The water of the last discovered spring, the Barisart, has a temperature of 52°, contains more carbonic acid than the Pouhon, and less iron. It sometimes proves useful where the Pouhon disagrees. This spring is much frequented.

These gaseous chalybeate waters are employed, to the extent of two or three pints daily, commencing with a couple of glasses before breakfast. They impart power, strengthen the digestion, and are valuable in such cachectic and other diseases as require a ferruginous tonic. The season is from the commencement of May until the end of September. During the early part of October the weather is often wet and cold.

CHAUDFONTAINE, in the valley of the Vesdre, has a thermal mineral spring which is used for bathing by sufferers from chronic rheumatism, neuralgia, irritability of the nervous system, &c. The temperature of the water is 92° Fahr. The solid contents are scarcely more than two grains in the pint, and consist of chloride of sodium and carbonate of lime. The surrounding country is very pretty; while there is much to be seen of great interest in the neighbouring manufacturing town of Liege—five miles distant.

468. *Bagnères de Bigorres, in the Pyrenees.*

This celebrated watering-place (1850 feet above the sea) is situated at the foot of the Pyrenees, on the left bank of the Adour, about 35 miles to the south-east of Pau. The season commences in June and ends about the middle of October.

The springs in Bagnères and its neighbourhood are numerous, and may be divided into three classes :—1. THE SALINE. The temperature of these waters varies from 124° to 85° Fahr. ; the chief chemical products found in them being *carbonic acid, chlorides of magnesium* and *sodium, sulphates of lime* and *soda*, and *magnesia, subcarbonates of lime* and *magnesia* and *iron*, an infinitesimal proportion of *arsenic*, with *resinous* and *vegetable extractive matter*, and *silex*. 2. THE FERRUGINOUS. There is only one spring of this kind, properly so called—la Fontaine Ferrugineuse. 3. THE SULPHUROUS. Only one sulphurous spring has much reputation,—that of Labassère ; and its waters contain a minute quantity of *carbonic acid, hydrosulphuric acid, chloride of sodium, hydrosulphate of soda, subcarbonate of soda, vegeto-animal matter*, and *silex.*

The general effect of the waters, taken internally and used as baths, is that of a stimulant to the mucous membranes, kidneys, lymphatic system, and skin. They are useful, more particularly, in diseases of the bones and articulations; in chronic rheumatism, and allied disorders, as neuralgia, sciatica, &c., in atonic dyspepsia from over mental work; and in nervous affections,—hysteria, palpitations, hypochondriasis, gastrodynia, &c., especially if there be biliary derangements. The Labassère waters are beneficial in cases of excessive secretion from the mucous canals, in many skin diseases and in some morbid states of the abdominal viscera. In anæmic conditions, valuable effects result from the employment of the ferruginous spring.—Patients who have been benefited by Pau during the winter may advantageously proceed to Bagnères for the summer.

When the saline waters are taken for their alterative effects, the daily dose is small,—about a pint; but if a purgative action is needed, from one to two quarts, in divided quantities, should be drunk daily.

469. *Capbern, in the Pyrenees.*

Situated about ten miles from Bagnères de Bigorres, the waters of Capbern are of a saline character like most of those in that neighbourhood. Their chief constituents are *carbonic acid gas, sulphates of lime* and *magnesia*, with *carbonate of lime.* One authority says that they also contain carbonate of lime, while another asserts that there is not a trace of it. They are deemed useful in congestions of internal organs, and are supposed to have warded off apoplectic seizures, when the cerebral circulation has been sluggish: they stimulate the uterus and ovaries, and have been said to cure sterility: while many cases of chlorosis, leucorrhœa, dysmenorrhœa, &c., seem to have been benefited by them. The dose is from four to six tumblers, early in the morning, taking exercise between each glass. At the same time reclining or douche baths are employed.

470. *Barèges, in the Pyrenees.*

This village, on the Gave de Bastan, 47 miles from Pau, is about 4000 feet above the sea.—The season lasts from the beginning of June until the middle of September.

The well known sulphurous and stimulating waters of Barèges are of three kinds, as regards temperature:—viz., the *hot source*, the *temperate*, and the *tepid.* The principal baths are, the BAIN DE L'ENTREE, 107° Fahr.; BAIN DU FOND, 98°; BAIN DE POLARD, 101°; and BAIN DE LA CHAPELLE, 84°. The waters of all are limpid, have an oily nauseous flavour, and exhale an odour of rotten eggs. They contain *nitrogen, sulphuret of sodium, sulphate of soda, chloride of sodium, silica, lime,* &c. On their surface is found a thin gelatinous kind of pellicle called *barègine*, or *glairine*, or *zoogene*; which is probably of a vegetable character, is emollient and softening, and is supposed to have some peculiar power in curing chronic rheumatism.

These waters are beneficial in inveterate squamous, pustular, and papular skin affections; in some forms of scrofula; in chronic rheumatism, sciatica, lumbago, and stiffness of the muscles or tendons; in strumous and other indolent ill-conditioned ulcers; and in irritation from the presence of carious or necrosed bone. For healing sinuses left by old gunshot wounds they are considered particularly efficacious. Pulmonary cases derive more benefit from Eaux-Bonnes and Cauterets. Moreover, the waters of Barèges are not to be prescribed when there is any tendency to inflammatory disorders, or in heart disease, or for irritable nervous temperaments. They are more powerful and stimulating than the waters of St. Sauveur.

The waters are taken internally, as well as employed in the form of baths, douches, lotions, and injection.

471. *St. Sauveur, in the Pyrenees.*

Situated on the Gave de Pau, in the valley of Laverdan, this watering place (2500 feet above the sea) is 44 miles from Pau, 4 from Barèges, and 1 from Luz. The still Alpine air is mild, and yet bracing. The season is from May until October.

The waters are milder than those of Barèges, but have the same constituents. Their temperature varies from 135° to 80° Fahr. They are useful for women and children, in the same disorders as are sent to Barèges. Hysteria, neuralgia, hypochondriasis, leucorrhœa, and irregularities of the catamenial flow, are much benefited by them. When taken internally they have to be diluted, their greasy properties, from the excess of barègine, being so great. They are mostly used as reclining and douche baths, vaginal injections, &c.

472. *Bagnères de Luchon, in the Pyrenees.*

This little town, in a magnificent valley surrounded by noble mountains, is 85 miles from Pau, and 2000 feet above the sea. The season lasts from June to the beginning of October. The arrangements for drinking the waters are all good.

There are upwards of 48 thermal sulphurous springs, the temperature of the waters varying from 152° to 62° Fahr. Their chief constituents are *sulphuret of sodium, chloride of sodium, silicate of lime*, and *silica;* with traces of the *sulphurets of iron* and *manganese, iodide of sodium, sulphate of potash* and *soda* and *sulphite of soda*, &c. The waters are efficacious in chronic skin diseases, in stiffness of limbs after dislocations and fractures, in old ulcers, chronic bronchitis, rheumatism, and neuralgia. Also in some cases of torpid digestion, anæmia, hypochondriasis, hysteria, &c. Their effects are injurious when there is a tendency to plethora and nervous irritability. They are drunk in doses of three or four glasses, pure or mixed with milk; and are used as baths, injections, lotions, eyewashes, &c.

473. *Cauterets, in the Pyrenees.*

This celebrated watering place, imbedded among the mountains, in the valley of Laverdan, 3200 feet above the level of the sea, and more sheltered than Barèges, is much frequented by Spanish invalids. July and August are the best months, but September is also good. There are some 32 sulphuretted saline springs, the temperature of the warmest being 122° Fahr.

Some of the waters are very stimulating, causing headache and feverishness. They contain *nitrogen, sulphuret of sodium, sulphate of soda, chloride of sodium, silica*, &c. *Glairine* or *barègine*, a peculiar gelatinous substance (see F. 470), is also present. They are not to be used where there is any tendency to inflammatory affections. The cases most benefited by drinking the waters are chronic derangements of digestive organs, chronic rheumatism and rheumatoid arthritis, chronic skin diseases, uterine congestions or irritations, bronchial catarrh, the early stages of phthisis, and strumous affections. The waters are often taken diluted with milk.

The baths are especially valuable in rheumatic affections, scrofula, and obstinate skin diseases.

474. *Eaux-Bonnes, in the Pyrenees.*

Eaux-Bonnes, a village in a sheltered valley at the foot of the Pic de Gers, is 22 miles from Pau. The air is remarkably pure and fresh. The altitude above the sea level is 2400 feet. The active mineral waters, of which the supply is scanty, have been deemed efficacious in the early stages of tubercular and other chronic diseases of the respiratory organs. They are likewise useful in scrofula generally, in chlorosis, in dyspepsia from want of tone, and in amenorrhœa. The springs are slightly alkaline, and contain *chloride of sodium, sulphates of lime* and *soda, iodide of sodium*, &c. Their temperature is about 90° Fahr. The sulphurous waters are mildly stimulating; and are taken internally, and less frequently applied in the form of baths. In the commencement only small doses (three ounces) should be taken, the quantity being gradually increased to three or four glasses of six ounces each. While undergoing treatment the patient is encouraged to live as much in the open air as his symptoms will permit. A residence of about a month, for one or two seasons (the season lasts from June to the middle of September) is generally deemed sufficient. Afterwards a trip to Biarritz, for the enjoyment of sea bathing, may often be taken with advantage.

475. *Eaux-Chaudes, Pyrenees.*

The position of this village, hemmed in by precipitous limestone cliffs, is wild and secluded. It lies about 26 miles from Pau, and 4 from Eaux-Bonnes. The season lasts from the beginning of July until October.

Of the six springs some are used for baths, others as internal remedies. The hottest source is LE CLOT (96°); while L'ESQUIRETTE has the largest amount of salts. The waters contain *sulphuret of sodium, sulphate of lime, and silica.* They deposit *sulphuraire*, a confervoid growth. The taste of the waters is disagreeable, the smell of rotten eggs being powerful.

The waters (two to six glasses early in the morning) and baths are useful in rheumatism and sciatica, in neuralgia, in threatened pulmonary disease, in scrofula, and in atonic dyspepsia.

476. *Ussat, in the Pyrenees.*

The mineral baths of Ussat, in the Department of the Ariége, are 70 miles from Toulouse, the inhabitants of which city value them highly. They contain about 11 grains of solids to the pint,—chiefly *sulphates* and *carbonates of lime* and *magnesia*, and *chloride of sodium*, with traces of *arsenic*. The waters belong to the acidulous thermal class; are not at all unpleasant; are soothing to the nervous system; and hence prove useful in hypochondriasis, hysteria, chorea, paralysis agitans, neuralgia, cramp, muscular pains, dysmenorrhœa, irritable conditions of uterus, &c. Though sometimes taken internally, they are chiefly used as baths. The season lasts from June to October.

477. *Vernet les Bains, in the Eastern Pyrenees.*

The little village of Vernet, 16 miles from Perpignan, is placed in a deep well sheltered valley. The waters belong to the thermal sulphurous class; but are only feebly charged with solids—amongst others with sulphuret of sodium.

Where a long course of weak sulphur waters is needed, these baths may be resorted to in the winter as well as in the summer months. Sunny walks may be had on most days in winter, the climate being mild and equable. The waters are taken internally, and employed as warm and vapour baths; and this combination of drinking and bathing is thought efficacious in chronic chest affections.

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478. *Panticosa, in Arragon.*

This remarkable Spanish watering place, 56 miles from Pau, is situated at a level of 5800 feet above the sea. It is romantically placed in one of the little green valleys of the Pyrenees; being surrounded by the lofty granite mountains, except at one part through which flows the river Caldarés. There are four springs; two being saline, one sulphurous, and one ferruginous. The chief source is the FUENTE DEL HIGADO, which contains *nitrogen* in large quantity, with feeble proportions of *sulphate of soda, chloride of sodium, carbonate of lime, chloride of magnesium,* and *silica.* Its waters are agreeable, have a temperature of 81° Fahr., and numerous gas bubbles (owing to its free nitrogen) escape with it.

The waters taken internally increase the secretions of the liver and kidneys and skin; produce a sedative effect on the system; increase the appetite and general powers; and in pulmonary cases, relieve the cough. They are particularly recommended in laryngeal phthisis, in hæmorrhage from lungs or stomach or uterus, and in chronic irritation of the bronchial or intestinal mucous membranes. Where there is softened tubercle, or much debility of system, they do harm. The best part of the season is from the beginning of July till the end of August.

479. *Vichy, in Central France.*

This important alkaline thermal bath is situated on the right bank of the Allier, in a large open valley, surrounded by hills covered with vineyards. The altitude is 780 feet. The air is temperate and pure. The season lasts from the middle of May until the same time in September.

The springs used at Vichy for drinking and bathing are nine in number; the waters of all being limpid, and having somewhat the taste of soda water. *Bicarbonate of soda* and *carbonic acid gas* form the predominating ingredients; but they also contain small quantities of the *bicarbonates of potash* and *magnesia*, with the *arseniate of soda*. There is also some *barègine*, most abundant at the Source de l'Hôpital. The proportion of chief chemical components, in the sources generally resorted to, is shown in the following table :—

Grande Grille	107·8° F.	Bicarb. soda, grs.	37·50	Carbonic acid gas, grs.	6·97	to each 16 oz.
Puits-Chomel	109·6°	„	39·09	„	5·91	„
Fontaine de l'Hôpital	89°	„	38·60	„	8·21	„
Fontaine des Célestins	58·6°	„	39·19	„	8·04	„
Grand Puits Carré	110·5°	„	37·57	„	6·71	„
Puits d'Hauterive	59°	„	36·99	„	20·92	„

Wherever the use of strongly alkaline waters is indicated, those of Vichy will prove useful. They may be taken internally, or employed as baths; or used in both ways at the same time. The diseases which derive most benefit are,—pulmonary catarrh, debility and irritability of the digestive organs; chronic enlargement of the liver and spleen; uric acid gravel and calculi; vesical catarrh; chronic gout and rheumatism; diabetes; and some cases of albuminuria. Obesity has been lessened by these waters; and they might be employed with advantage where the blood contains an excess of fibrin.—The dose is from half a pint to two pints daily; but they must not be continued too long, lest a superalkaline condition of the blood be induced. The spring of the Grande Grille is in most repute, and is especially useful in liver diseases; while that of the Célestins is best for disorders of the urinary organs, as well as in the uric acid diathesis. The Hospital spring is in favour for chronic gastro-enteritis.

The Vichy waters are exported in considerable quantities, and it is supposed without their undergoing any deterioration.

VALS possesses several springs, all alkaline from the presence of *bicarbonate of soda*, but slightly differing in the proportion of the saline constituents. The ST. JEAN is the weakest, and is useful chiefly in dyspepsia. The PRÉCIEUSE and DÉSIRÉE are more alkaline and slightly laxative; they are employed in gouty and renal affections. The MAGDELEINE and RIGOLETTE contain a small proportion of *iron*, and are considered to be invigorating.

480. *Mont D'Or, in Central France.*

At this bath there are six thermal sources and one cold spring. The water of the latter, St. Marguerite, is acidulous from the carbonic acid it contains, has a temperature of 52° Fahr., and is an agreeable drink mixed with milk or wine. The thermal sources are LE GRAND BAIN (108°), the SOURCE OF CÆSAR (113°), the FOUNTAIN CAROLINE (107°), the BAIN RAYMOND (109°), the RIGNY (109°), and the MADELEINE (114°). The ingredients in the different waters only vary in quantity; consisting of the *carbonates of soda* and *lime*, *chloride of sodium*, *sulphate of soda*, with mere traces of *iron* and *alumina*. They all contain an excess of *carbonic acid*. The Madeleine spring is also strongly arsenical.

Besides drinking the waters, most invalids employ warm bathing. The effect is to increase the perspiration; and at the end of a few days to produce "the bath fever" (lassitude, depression, constipation, &c.), which soon passes off. The invalids who will derive benefit from a visit to Mont D'Or are such as have chronic pulmonary catarrh, some kinds of asthma, rheumatism, and congestion of the liver. Mischief will result to persons of a languid circulation, and such as have a tendency to hæmorrhage.

The season is from the middle of July to the end of August; but the waters should not be used for more than a fortnight on account of their exciting properties. The visitors who drink them take three or four glasses daily.

481. *Néris, in Central France.*

The thermal springs of Néris are resorted to, from May until October, for the purpose of drinking the waters and bathing in them. There are four wells; the temperature of the waters at their source being about 120° Fahr. They are insipid and oily; containing only small proportions of *carbonic acid*, *bicarbonate of soda*, *sulphate of soda*, and *chloride of sodium*. Confervæ grow feebly in the basins. These waters are recommended in cases of nervous and hysterical excitement, in rheumatism, and prurigo.

482. *St. Galmier, in Central France.*

These waters, owing to their richness in *carbonic acid gas*, are agreeable whether taken pure or mixed with wine; while they have the property of hastening digestion, increasing the appetite, and augmenting absorption from the alimentary canal. The chief salts in them are the *bicarbonates of lime and magnesia*.

The St. Galmier waters are cold, and resemble Seltzer water. They are in common use at Lyons; being deemed useful in gastric affections, and for preventing the formation of urinary calculi.

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483. *Aix-la-Chapelle* (*Aachen*), *in Rhenish Prussia.*

This town, in which Charlemagne was born and in which he died in 814, about 43 miles W.S.W. of Cologne, is situated in a valley between the Rhine and Maas rivers, and is surrounded by well wooded hills. It is 450 feet above the sea level. There are eight principal springs,—six thermal and slightly sulphurous, and two cold chalybeate. Their therapeutical effects are due to the high temperature of the water (varying from 111° to 131° Fahr.) and the *sulphur* and *chloride of sodium* contained in it. The latter salt is found in the proportion of about twenty grains to the 16 ounces; while the sulphuret of sodium varies from three-quarters to a quarter of a grain. Of the gaseous constituents the sulphuretted hydrogen is the most active, although it is only present in small quantity. The ELISENBRUNNEN is the principal drinking fountain; its exceedingly unpleasant water being derived through subterranean pipes from the hottest and strongest of the sources—the KAISERBAD. Very rarely the chalybeate springs are employed as an "aftercure;" but they have little power, one containing half, and the others three-quarters of a grain of iron in the sixteen ounces, with some carbonic acid.

In doses of a few glasses these clear transparent waters do not produce much appreciable effect; their chief use being externally,—as vapour baths, douches, shampooing, &c. The baths have considerable reputation for curing scrofula, skin diseases (acne, psoriasis, and prurigo), hepatic and renal complaints, chronic gout and rheumatism, functional derangements of the uterine organs, rebellious ulcers, and the ill effects produced by the use of mercury or lead. In cases of long standing stiffness about the joints, as well as in sprains, the rubbing and kneading and stretching of the muscles and articulations which are employed prove very efficacious. The springs are to be avoided where there is any tendency to cerebral, pulmonary, gastric, or uterine hæmorrhage. A course of the baths lasts from four to six weeks. The season begins early in June, and ends about the middle of September.

At BORCETTE, or BURTSCHEID, a suburb of Aix, there are several bath establishments. The thermal springs are divided into the sulphurous and non-sulphurous. The most important of the former is the *Trinkquelle*; the water of which contains *chloride of sodium*, with *sulphate* and *carbonate of soda*, and has a temperature of 140° Fahr. The *Kochbrunnen* is the most used of the non-sulphurous springs. The waters of Borcette are recommended for the same class of cases as is sent to Aix. The advantage of the former place over the latter is, that it affords a much cheaper residence.

484. *Kreuznach, in Rhenish Prussia.*

The rather nauseous and bitter waters of this Spa have a considerable reputation for the cure of uterine diseases, as well as of most scrofulous affections. The chief waters are those of the ELIZABETH BRUNNEN, having a temperature of 54·50° Fahr. They contain about 90 grains of solid constituents in 16 ounces :—chiefly,—*chloride of sodium* (73), *chloride of calcium* (13), *chloride of magnesium* (4), *bromide of magnesium* ($\frac{1}{4}$), *oxide of iron* ($\frac{1}{6}$), with a trace of *iodide of magnesium*, &c. The KARLSHALLER WATER has a temperature of 59°, and 75 grains of salts in the sixteen ounces; the THEODORSHALLE 70·25°, and 87 grains; while for the chief well of MUNSTER the numbers are 81·50°, with from 64 to 76 grains.

In drinking the waters it is better to begin with small quantities, which may be drunk pure or mixed with hot milk. The baths are generally taken tepid; "mother lye" (the brownish glutinous liquid left in the boiling pans, after the salt has been crystallized and removed) being added to the water, in proportions suitable to the requirements of each case. In uterine affections, fomentations and vaginal injections are employed in addition to the baths.

The Kreuznach waters have proved valuable in congestions of the uterine organs; as well as in chronic inflammatory affections of these parts, in hypertrophy and induration, in uterine displacements, and in derangements of the menstrual functions. DR. PRIEGER, who has had very great experience in the use of these waters, tells the Author that he has never seen a true fibroid tumour of the uterus absorbed through their influence; but when such a growth is œdematous or congested, the waters relieve these complications. Hypertrophies of the mammary glands, cases of chronic skin disease, as well as scrofulous ulcers, are oft-times benefited by these waters.

The season extends from the end of April until the beginning of October. The stay which a patient should make may vary from six to eight weeks.

The springs of NAUHEIM, a village of Hessen-Cassel, resemble those of Kreuznach, except that they contain rather more chloride of sodium, only a trace of bromide of magnesium, and none of the iodide of magnesium. There is also an abundance of carbonic acid; and the temperature of the four chief springs varies from 72° to 92° Fahr. The waters are drunk and used as baths; while like those of Kreuznach, they are recommended for all strumous affections.

485. *Neuenahr, in Rhenish Prussia.*

This village, in the mild and picturesque valley of the Ahr, is easily reached from Cologne. Of the springs, the Victoria is the best. MR. MILLER, the late Professor of Surgery in the University of Edinburgh, says that it is the richest of all known brunnens in carbonic acid. It furnishes some 29,792 cubic feet of water daily; an analysis of which has shown the presence of small quantities of *bicarbonate of soda*, *sulphate of soda*, *chloride of sodium*, *bicarbonate of magnesia*, *bicarbonate of lime*, *protoxide of iron and alumina*, *silica*, and free *carbonic acid*.

The waters are taken internally and applied externally. The dose is from two to five tumblerfuls, early in the morning; with half the quantity in the evening. The temperature of the water is between 78° and 80° Fahr., and the taste is pungent and pleasant, resembling—as an English valet said—"Seltzer water with the chill off." The best time for the bath is two or three hours after breakfast; the temperature of the water being about 88°, and the time for remaining in it twenty minutes. When the invalid is acclimatised, the douche may be used if needful.

The waters are tonic and anti-rheumatic; acting especially on the mucous membranes and the glandular system. They are useful in simple dyspepsia, diminished secretion of bile, irritability of the bladder with excess of uric acid in the urine, chronic gout and rheumatism, asthma uncomplicated with organic disease, chronic affections of the larynx or bronchi, eczema and prurigo, and chronic uterine maladies.—In a person apparently healthy DR. WEIDGEN found that the use of the waters was followed by these effects :—A sense of warmth in the stomach soon after drinking; exhilaration; increased flow of urine; increased appetite; and increased salivary and bronchial secretions. After a week the bowels were affected; copious, soft, bilious evacuations being produced. The urine became neutral, but never alkaline.

486. *Ems, Duchy of Nassau.*

Ems, or Bad-Ems (as the Spa is called, to distinguish it from the old village or Dorf-Ems), lies on the right bank of the Lahn, enclosed in a narrow valley between high mountains, 15 miles N. of Wiesbaden. Ems is 290 feet above the sea level. The air is mild: the situation attractive. There are several springs. The waters are alkaline, saline, and gaseous; while the temperature varies from 86° Fahr. to 133°. The chief constituents are *carbonate of soda*, *chloride of sodium*, and *carbonate of magnesia;* with small quantities of *carbonate of lime*, *iron*, *manganese*, *potash*, and *lithia*. Their action is that of a mild alterative, diuretic, and laxative; and they are believed to favourably influence all catarrhal affections of the mucous membranes.

The principal drinking springs are the KRAENCHENBRUNNEN and the KESSELBRUNNEN. The waters of the former are clear, odourless, have a temperature of 80° and leave a soapy taste owing to the soda they contain. According to STRUVE each 16 ounces contains 15½ cubic inches of free carbonic acid gas. The Kesselbrunnen or Kurbrunnen waters give out more carbonic acid, and are 118°. The dose is from one to six beakers, each holding about 4 oz. In many cases it is an improvement to add one-third part of goats' or asses' milk to the measure.

The waters are also employed externally, the baths being partly filled overnight to lower the temperature. The BUBENQUELLE (boy's spring), 117°, is used as a vaginal douche; and is in repute for the cure of sterility due to uterine and vaginal leucorrhœa, or to inflammatory affections of the cervix uteri.

The waters generally are recommended in chronic bronchial and pulmonary affections, with irritable cough but without profuse secretion, in the dyspepsia of such as have only a tendency to phthisis, as well as in eczema and prurigo. For the relief of the lithic acid diathesis they are valuable, but less so than those of Vichy. For drinking and bathing, French and German visitors usually resort to Ems in June. The best months are May, June, September, and October. Our own countrymen, however, seem to prefer July and August; though the narrowness of the valley in which this bath is situated causes the air to be very oppressive and relaxing during these two months.

The mineral springs of FACHINGEN, a village 9 miles E.N.E. of Nassau, on the Lahn, resemble those of Ems, the carbonate of soda and carbonic acid being present in rather larger proportions. The waters form an agreeable antacid drink in some forms of dyspepsia.

487. *Selters, in Nassau.*

This village, in a pleasant valley 37 miles N. of Wiesbaden, is everywhere famous for its mineral springs; an enormous quantity of Seltzer water being annually exported. Selters is 800 feet above the sea level.

The water has a temperature of 60° Fahr., and contains much more than its volume of carbonic acid gas. It has about 32 grains of solids in the sixteen ounces; chiefly *chloride of sodium* (18), and *carbonate of soda* (9), with minute quantities of *sulphate of soda*, *lime*, *magnesia*, and *iron*. Seltzer water stimulates the stomach; and is a grateful, antacid, slightly alterative drink.

Apollinaris water, somewhat richer in saline ingredients but otherwise similar in all its properties to Seltzer water and very agreeable as a drink, has lately been most extensively used.

488. *Schwalbach and Schlangenbad, in Nassau.*

SCHWALBACH or LANGENSCHWALBACH, 8 miles N.W. of Wiesbaden, consists of one long street, in the middle of which is the Kursaal. The climate is bracing; the altitude is 900 feet. The gaseous chalybeate waters, with a temperature of 50°

Fahr., owe their invigorating properties to *carbonate of iron*, which is held in solution by an excess of *carbonic acid*. They also contain a small amount of the *bicarbonate of soda, magnesia,* and *lime.* The chief springs are—the WEINBRUNNEN, near the Kursaal, which contains most iron, and is believed to counteract the evils arising from excessive indulgence in wine; the PAULINENBRUNNEN, the mildest, which was formerly used by invalids from tropical climates with torpid livers, but which appeared to be deserted in 1867; the ROSENBRUNNEN, only employed externally, the baths being heated by steam to 86° or 90°; and the STAHLBRUNNEN, in the northern valley, which is the most exciting of the springs. The waters are drunk fasting, to the amount of one to three glasses, twice a day; and they may be strongly recommended in cases of impaired strength where a ferruginous tonic is indicated, as well as in those examples of dyspepsia and constipation which are due to a torpid and anæmic condition of the walls of the alimentary canal. The bath should be taken about two hours after breakfast, omitting its use every third or fourth day. The best time for a visit to Schwalbach is from the middle of June until the end of August.

Rather more than two miles from Schwalbach, in a pleasant valley, with romantic environs, is SCHLANGENBAD. The climate is pure and bracing; the height above the sea being 930 feet. As a Spa Schlangenbad is of insignificant value, owing to the small amount of solid constituents—only a few grains of *carbonate of soda, lime,* and *magnesia,* with *common salt*—in the waters Warm saline and mud baths are used by the visitors; such amusements being in repute for softening and whitening ("satinizing") the skin, and for allaying nervous irritability. The season lasts from the beginning of June until September.

489. *Wiesbaden, in Nassau.*

Wiesbaden, the capital of the Duchy of Nassau, lies on the southern slope of the Taunus mountains, 5 miles N.N.W. of Mayence. It is the most frequented of the watering places in Germany. The season extends from June until September, but it is very hot in July and August. Owing to the shelter afforded by the several peaks of the Taunus, the autumnal and winter climate is good.

There are some eighteen or twenty thermal springs, but only one is of much importance. This, the KOCHBRUNNEN, rising nearly in the centre of the town, appears literally to resemble a boiling well. The temperature varies from 150 to 160° Fahr., volumes of vapour are emitted, and the water contains some 63 grains of solids in the sixteen ounces. The salts are *chloride of sodium* (52½); with small quantities of *potash, lime, iron, magnesia, arseniate of lime, bromide of magnesium,* &c. The *carbonic acid gas* is one fifth of the bulk of the water. SIR FRANCIS HEAD and DR. GRANVILLE compare the taste to that of weak chicken broth slightly salted. Taken in a dose of three or four glasses, cooled, before breakfast, it has a slightly laxative and diuretic effect, and increases the appetite. As baths, at a temperature varying from 86° to 98°, about two hours after a light breakfast, the waters are somewhat soothing, while they increase the action of the skin and kidneys.

The cases in which these waters are likely to prove valuable, are chronic gout and rheumatism, hepatic congestion with hæmorrhoids, and chronic skin diseases connected with abdominal plethora. They will be injurious in debility, in congestion of the uterine organs, or where there is a tendency to apoplexy or any other form of hæmorrhage. The invalid may know that they disagree, when prostration, loss of appetite, constipation, irritability, and palpitations are produced; or when the doses give rise to a feeling of disgust, especially if they have been previously regarded as rather agreeable. The course ought not to extend beyond four or five weeks. The country in the neighbourhood of Wiesbaden is charming.

490. *Soden, in Nassau.*

The waters of Soden, in the Taunus near Frankfort, are saline and gaseous, issuing from twenty-three springs, scattered through the village. Their temperature varies from 64° to 75° Fahr.

The most important springs are,—the MILCHBRUNNEN containing 23 grains of solids in the 16 ounces; 17 grains being *chloride of sodium*, 3 *chloride of potassium*, with 17 cubic inches of *carbonic acid gas.* The WARMBRUNNEN has 35 grains of solids, 26 of which are *chloride of sodium;* the *carbonic acid gas* being 35 cubic inches. The Wilhelmsbrunnen has 117 grains of salts, 104 being *chloride of sodium,* with 48 cubic inches of gas. Whilst the Soolbrunnen has 129 grains, 114 of which consist of the same salt that predominates in the others, together with 14 cubic inches of gas.—Where alterative aperients are needed, these waters may perhaps be recommended. They are deemed useful in pulmonary, strumous, gouty, and uterine affections.

One advantage possessed by Soden is the presence of the two ferruginous springs of Kronthal; so that the visitor having employed the alteratives of the first Spa, may strengthen the system with the mild chalybeates of the Stahlquelle or Wilhelmsquelle. The climate of Kronthal is useful in chronic bronchial affections.

491. *Homburg, in Nassau.*

Homburg lies about nine miles north-west of Frankfort; being 660 feet above the sea level. The air is invigorating and bracing during the months of June, July, and August; but it is injurious to such as have delicate lungs, owing to the temperature being very variable. There are four cold (about 50° Fahr.) muriated mineral springs; all rising near each other in the park or Kurgarten. The most frequented is the Elisabethquelle, containing about 110 grains of salts in the 16 ounces, and being strongly charged with carbonic acid (48 cubic inches). The chief salts are *chloride of sodium* (79), the *chlorides of magnesium* and *calcium* (15), and *carbonate of lime* (11); with small quantities of *carbonate of magnesia, sulphate of soda, carbonate of iron,* and *silica.* The Kaiserquelle has more *chloride of sodium* (117), more *chloride of calcium,* and a little more *iron.* The Stahlquelle has the same amount of common salt as the Elizabeth spring, but is more ferruginous than either of the others. While the Ludwigsquelle is weak in almost all its constituents. The flavour of all the waters is refreshing, saltish, somewhat bitter, and ferruginous.

Gout, dyspeptic and other derangements of the abdominal viscera, strumous enlargements of the external glands and mesentery, debility of the reproductive organs, constipation, obesity, and hypochondriasis are the diseases most likely to be benefited. From two to four tumblerfuls of the waters are taken fasting during three or four weeks. Though chiefly used internally, there are baths, douches, &c.

492. *Baden-Baden, in Grand Duchy of Baden.*

This renowned Spa, rather more than 600 feet above the sea, in one of the most delightful valleys of the Black Forest, about six miles from the Rhine, has 16 weak saline springs, the temperature of which varies from 117° to 161° Fahr. The chief spring, and the only one demanding notice, is the Ursprung; which has a transparent, inodorous, saltish water. Its chemical constituents are merely about 23 grains to the 16 ounces, 18 grains being *chloride of sodium.* There are also 2½ grs. of *sulphate of lime,* about 1-10 of a grain of *carbonate of iron,* with less than half a cubic inch of *carbonic acid.* Recent analyses have shown the presence of *lithia,* in greater abundance than in any other springs.

Though their efficacy must be slight these waters are often taken internally. Some drinkers add goat's milk to them, or whey, or aperient salts. But they are chiefly to be employed where simple hot baths are needed, while the invalid is enjoying beautiful scenery, in pure mild air. They may be recommended in chronic gout and rheumatism, dyspepsia from overwork, nervous affections, &c. The season lasts from the beginning of May until the 1st October.

The waters of Wildbad, about thirty miles from Baden-Baden, and situated in the kingdom of Würtemburg, contain only 4 grains of salts in the 16 ounces, and have a temperature varying from 86° to 98° Fahr. Where hot baths and douches are needed in chronic paralysis, rheumatism, &c., a six weeks' sojourn at Wildbad may perhaps be recommended. The climate is very bleak from November until May; and then in the four succeeding fashionable months the heat is most oppressive. Wildbad is some 1320 feet above the sea.

493. *Kissingen, in Bavaria.*

Kissingen, one of the most fashionable watering places of Germany, is situated in a fertile valley, about 30 miles N.N.E. of Würtzburg. Its height above the sea level is some 800 feet. The tonic, laxative, and alterative waters are all cold (about 52° Fahr.) The most important spring is the RAGOCZY, containing 65 grains of solids in the 16 ounces, according to LIEBIG, with 41 cubic inches of *carbonic acid gas.* The principal salts are *chloride of sodium* (45), *carbonate of lime* (8), *sulphate of magnesia* (4), *chlorides of potassium* and *magnesium* (5), with minute quantities of *chloride of lithium*, *bromide* and *iodide of sodium*, and *carbonate of iron.* The waters of the PANDERBRUNNEN have rather a smaller amount of solids; while those of the MAXBRUNNEN and of the THERESIENBRUNNEN are very much weaker, and contain no iron.

The Ragoczy spring is most used early in the morning, from three to six glasses being taken. In the evening the milder waters of the Pandur are preferred. The effect is to quicken the circulation, and to stimulate the secretions of the mucous membranes generally but especially those of the alimentary canal. Hence they are valuable in habitual constipation, congestion of the liver or kidneys, in dyspeptic eructations or flatulence, and in strumous enlargements of the glands. They may also do good in threatened tubercular diseases of the mesenteric glands. Gouty and calculous cases also derive benefit.

The baths are prepared from the waters of the wells just named, some of the "mother water" of the SOOLENSPRUDEL being frequently added. This spring has a temperature of 62°; and contains 187 grains of solids in the 16 oz., upwards of 100 consisting of *chloride of sodium.* The astonishing flux and reflux of the Sprudel, some eight or nine times a day, is one of the sights of the town.

About 4½ miles from Kissingen is the Spa of BOCKLET, in Bavaria, which contains several chalybeate and a weak sulphur spring. The temperature of the waters is about 52°; while there is rather more than half a grain of *carbonate of iron* in the 16 oz., with 39 cubic inches of *carbonic acid gas.* They also contain a small amount of the *sulphates of soda* and *magnesia*, *chloride of sodium*, *carbonate of lime*, &c. Independently of the constant interchange of visitors between Kissingen and Bocklet, the baths of the latter (especially the "douche ascendante") have a considerable reputation for the cure of sterility, and for breaking off the tendency to habitual abortion. Bocklet is 620 feet above the sea.

BRÜCKENAU, in Bavaria, is also only a few hours' drive from Kissingen. The waters contain scarcely any salts, but have about a quarter of a grain of *iron* in the 16 oz., with at least 35½ cubic inches of *carbonic acid gas.* Their temperature is 49°. They are often employed by those who, after going through a course of the solvent waters of Kissingen, require a pure mild tonic.

The ADELHEIDSQUELLE is a well known salt water spring, found at the small village of Heilbrunn, in Bavaria. Prettily situated, not many miles from Munich, this village is said to be 2400 feet above the level of the Mediterranean. The well affords a comparatively small supply of water, which has a temperature of 50° Fahr. It contains 47 grains of solids in the 16 ounces; upwards of 38 grains consisting of chloride of sodium, with 6 grains of carbonate of soda. There are also small quantities of iodide and bromide of sodium, silica, &c. The alterative effect of these waters renders them useful in all kinds of scrofulous affections. The season is from the early part of May until the end of September. The accommodation for visitors is scanty.

494. *Gastein, in Austria.*

A few hours' drive from Salzburg is the village of Gastein, in the most beautiful part of the Tyrol. It is one of the highest baths in Europe, being 3200 feet above the Mediterranean. The houses are grouped round the edge of the mountain torrent Ache, which here forms a splendid waterfall. The bracing alpine air is invigorating for such as have strong lungs, but the climate is often too raw and unsettled for the delicate invalid to depend upon it. Mean annual temperature 47° Fahr. July and August are the season months.

There are six or eight very weak thermal springs, having the same chemical composition, but varying in temperature from 95° to 118°. In 16 oz. of water there are only 2·68 grs. of solids, *sulphate of soda* being the chief (1·51). The waters, after cooling to about 90°, are used as baths, and are said to stimulate the nervous system. It seems certain that the prematurely old, the hypochondriac, the paralytic, and the sufferer from chronic rheumatism derive benefit.

The waters of TEPLITZ, in Bohemia, very much resemble those of Gastein, as regards temperature and chemical power. They contain only about 4·64 grains of solids in the 16 oz.; the *carbonates of soda* and *lime*, with *sulphate of soda* being the chief ingredients. The baths are used in gouty and paralytic affections; as well as in rheumatoid arthritis, chronic disease of the spine and large joints, and functional derangements of the uterine organs. The town lies in a fertile valley, 640 feet above the sea; the environs are remarkable for their beauty; while the climate is healthy and genial.

495. *Friedrichshall, in Saxe-Meiningen.*

This place has long been noted for the manufacture of Glauber's salts and common salt. Of late years the purgative waters have acquired a high reputation, more especially for cases where it is necessary to promote excretion from the liver, kidneys, and bowels.

The bitter saline water of Friedrichshall is bright and clear, of a light yellowish tinge, free from smell, and possessing a salt bitter flavour. According to LIEBIG'S analysis (made in 1847) it contains about 194 grs. of solids in the 16 ounces, with 5·32 cubic inches of *carbonic acid gas*. The chief ingredients are *chloride of sodium* (61), *sulphate of soda* (46), *sulphate of magnesia* (39), *chloride of magnesium* (30), *sulphate of lime* (10), with small proportions of *sulphate of potash*, *carbonate of magnesia*, *bromide of magnesium*, *carbonate of lime*, and *silica*.—The dose is from three ounces to a pint or a pint and a half, according to the aperient effect required. Large quantities of this water are exported annually to different parts of Europe.

496. *Carlsbad, in Bohemia.*

This town occupies the bottom of a narrow winding valley, on the banks of the Töpel, 70 miles W.N.W. of Prague. The season extends from the beginning of June until the end of September; but the month of May is very quiet and pleasant and healthy, although the mornings are often cold. The "cure" generally occupies from five to six weeks. Carlsbad is 1200 feet above the sea.

There are several important springs, chiefly differing from each other only in temperature. The most important is the SPRUDEL; the waters of which bound upwards for four or five feet, and then fall back in foam, while giving off clouds of vapour. The temperature is about 165° Fahr., and there are some 45 grs. of solids in the 16 oz. The principal salts are *sulphate of soda* (20), *sulphate of potash* (9), *chloride of sodium* (8), and *carbonate of lime* (2); with small quantities of *carbonate of soda*, *carbonate of iron*, *phosphate of alumina* and *silica*. The *carbonic acid gas* is nearly 8 cubic inches.—The SCHLOSSBRUNNEN contain only half the amount of *sulphate of soda*, double the quantity of *carbonic acid gas*, and have a temperature of 123°. The heat of the waters of the THERESIENBRUNNEN is 131°, and as regards important ingredients may be said to resemble the Schlossbrunnen. The MARKTBRUNNEN differ from the others principally in containing a little *iodide* and *bromide of sodium*. The temperature is 130°.

The waters are chiefly taken internally, early in the morning and again in the evening. The dose varies from one or two glasses to ten or twelve; according to the stimulating and alterative and aperient effects on the digestive organs and abdominal viscera generally, which it is desirable to produce. The cases most benefited are,—liver and abdominal diseases, diabetes, gouty and rheumatic disorders, calculous affections, and hypochondriasis with dyspepsia and constipation. The waters are also useful in rheumatoid arthritis, sciatica, and in jaundice from obstruction by gallstones. Old Indians, with enlarged livers, often derive remarkable relief. Baths of the cooled mineral water are now but seldom resorted to, though for one hundred and fifty years invalids only visited Carlsbad for the purpose of bathing. Sometimes the peat soil from the neighbourhood, mixed with Sprudel water, is used as a poultice, &c.

497. *Marienbad, in Bohemia.*

Marienbad, in the territory of the abbey of Töpl and the district of Eger in Bohemia, is about five hours' drive from Carlsbad. The air is pure and dry, but changes in temperature take place rapidly owing to the height of the village—1912 feet above the level of the North Sea. The season lasts from the commencement of May until the end of September.

There are several cold (from 43° to 50° Fahr.) saline chalybeate springs; the chief constituent being sulphate of soda, with a moderate quantity of iron and carbonic acid. The waters when drawn are quite clear, but as the gas escapes they become turbid from deposition of the carbonates. The KREUZBRUNN—the principal spring—has 69 grains of solids in the 16 oz., with 8½ cubic inches of *carbonic acid gas.* The chief salts are *sulphate of soda* (38), *chloride of sodium* (13), *carbonate of soda* (9), *and carbonate of magnesia* (3); with small quantities of the *carbonates of lime, lithia, iron, manganese, &c.* The FERDINANDSBRUNN has nearly the same solid ingredients, but with nearly 14 cubic inches of *carbonic acid gas.* The WALDBRUNN is much weaker in *sulphate of soda* (7), *and common salt* (3), but its proportion of *carbonic acid gas* is 18¾ cubic inches. The waters of these brunnen are all used for drinking. The CAROLINENBRÜNN has only 11 grs. of solids in the 16 oz., *sulphate of soda* being the chief; but there are 15½ cubic inches of *carbonic acid gas.* The AMBROSIUSBRUNN is still weaker (7 grs. in 16 oz.), with 13 inches of gas; while the MARIENBRUNN has scarcely any salts (2 grs. in 16 oz.), with 9 cubic inches of *carbonic acid gas.* The well of the Marienbrunn is used only for water and gas baths; but the Caroline and Ambrosius waters are employed internally as well as externally.

The effect of the Marienbad waters is laxative, alterative, and tonic, in proportion to the dose (from one to six tumblerfuls); while they increase the action of the liver and kidneys, and promote appetite. Hence they are particularly valuable in chronic disorders of the abdominal viscera. The mud baths and poultices are made with the Marienbad water mixed with a black mineral pulverulent substance, brought from a neighbouring peat bed. They stimulate the skin, heal chronic ulcers, and disperse glandular swellings. The gas baths (carbonic acid with a small amount of sulphuretted hydrogen) soothe muscular and neuralgic pains, remove torpor of the female sexual organs, and generally tranquillize the nervous system.

The bitter saline waters of PÜLLNA, in Bohemia, are very nauseous and indigestible, while they possess no advantages over the ordinary preparations sold by the chemist. Their chief ingredients are *sulphate of magnesia* (96 grains in the 16 oz.), *sulphate of potash* (82), *sulphate of soda* (12), *chloride of magnesium* (16), *carbonate of magnesia* (6), *with sulphate of lime, carbonate of lime, and bromide of magnesium.* Püllna water is largely exported.

498. *Eger, in Bohemia.*

This frontier town stands on the right bank of the Eger, 92 miles W. of Prague. In the district, some three miles off, is the Spa of FRANZENSBAD. The tonic solvent waters of this spring have a refreshing acidulous taste, a temperature of 52° F., with 42 grains of solids in the 16 oz. The chief of these are *sulphate of soda* (24), *chloride of sodium* (9), *and carbonate of soda* (6); together with the *carbonates of magnesia, lime, iron, lithia, manganese, and strontia*, and 40 cubic inches of carbonic acid gas.

The waters of the Franzensbad and other wells are taken internally and employed as baths. They strengthen the nervous system, improve digestion, stimulate the circulation, relieve bronchial affections, and act powerfully on the uterine organs. Mud and gas baths are especially in favour. The boggy earth is sifted free from foreign matters, and converted into black mud; which is heated to 100°, and which contains sulphate of soda, iron, lime, alumina, and ulmic acid. In this mineralized mud the body is immersed for fifteen minutes, when the patient transfers himself to a plain water bath to remove the dirt. The treatment is said not to be disagreeable; and it may perhaps prove beneficial in chronic skin diseases, indolent ulcerations, old rheumatic affections, gouty deposits, and in paralysis without active disease of the nervous centres. The gas baths are considered as specifics for the cure of scrofulous ulcers.

499. *Aix-les-Bains, in Savoy.*

This beautiful and sheltered town, 788 feet above the sea, may be reached by railway from Paris in about fifteen hours. The climate is mild but yet bracing, and is especially adapted to invalids from April until October. There are two chief springs; but as they are only slightly mineralized, the effects which they produce must chiefly be due to their temperature,—about 116° Fahr. The SULPHUR SPRING contains but little more than 3 grains of salts in the 16 oz., with a small quantity of *carbonic acid* and *sulphuretted hydrogen gas*. The ALUM SPRING, so called on the *lucus à non lucendo* principle, since it contains no alum appreciable to the senses, has the same composition minus the sulphuretted hydrogen.

The waters are chiefly used externally, and especially in the form of douches. They are valuable in chronic rheumatism, sciatica, rigidity of tendons or muscles after sprains and contusions, chronic skin affections, diseases of the bones, nervous disorders, &c.

500. *Baths of Switzerland.*

LEUK or LOUËCHE, on the Rhone, stands a little to the left of the high road passing through the Valais to the Simplon, and is nearly 4500 feet above the sea. There are twenty-three thermal mineral springs, varying in temperature from 95° to 124° Fahr. The latter is the heat of the St. Laurent or Lorenzquelle. All the waters have the same composition, the solid constituents being about 15 grs. in the 16 oz. The chief salt is the *sulphate of lime* (nearly 13), with small quantities of the *sulphates of magnesia* and *soda*, &c. It is the custom to bathe in common; there being four public piscinæ, each about a yard deep, and each capable of accommodating some forty bathers, with their small floating tables. On the first day the patient remains an hour in the water, clothed in a long flannel gown; the duration being daily increased till it extends to four or five hours in the morning, and for a shorter period again in the afternoon. About the twelfth day, an erythematous rash called the *poussée* appears over the body, with prickling sensations of heat, and febrile symptoms; its disappearance being followed by desquamation of the cuticle. The duration of the bath is then gradually diminished by half an hour daily, until the cure is complete in some twenty-five or thirty days from the commencement. This peculiar practice is recommended in cases of scrofula, enlargements of the liver or spleen, chronic gout and rheumatism, obstinate eczema and psoriasis, old wounds and ulcers, calculous affections, &c. The season is from May until October.

PFEFFERS, in the Canton of St. Gallen in the Grisons, is in a wild and sombre dell. It is 2115 feet above the sea. The feeble thermal water is conducted down the romantic glen of the Tamina by wooden tubes, to the hotel and bathing house at Ragatz, in the valley of the Rhine. The salts in the waters are scarcely equal to 2 grains in the 16 oz.; the chief being the *sulphates of soda and lime*, with *chloride of sodium* and *carbonate of lime*. The temperature is nearly 100° Fahr. The bath is used twice a day, for about half an hour each time; and is useful in calming nervous irritability, and in relieving neuralgia, hysteria, &c. The waters are also used for drinking,—from four to eight tumblerfuls. The invalid should be advised to reside at Ragatz rather than at Pfeffers, which generally has a cheerless and sunless aspect. When, however, the fall of snow during the preceding winter has been less than usual, the supply from the hot spring is so diminished in quantity, that sufficient water cannot be conveyed to Ragatz. The season lasts from the beginning of June until the end of September.

Tarasp, on the right shore of the Inn in the Grisons, has cold gaseous springs somewhat resembling those of Marienbad. There are numerous wells, having their source in a rocky hollow some 4300 feet above the sea. The chief are the Grosse Quelle and the Kleine Quelle, their composition being similar, and their temperature 45° Fahr. Their salts (95 grs. in the 16 oz.) consist of *chloride of sodium* (29), *carbonate of soda* (27), *sulphate of soda* (16), and *carbonate of lime* (12), with small quantities of the *carbonates of magnesia* and *iron, iodide of sodium, sulphate of potash*, &c. The *carbonic acid gas* is 32 cubic inches. These aperient and resolvent waters are useful in plethora of the abdominal viscera, and in incipient phthisis.

St. Moritz, Upper Engadin, Grisons, lies 5863 feet above the sea, in a valley surrounded by high mountains, close to large glaciers. This height will be better appreciated by remembering that Ben Nevis, in Inverness-shire, is 4380 feet high, and Snowdon, in Caernarvonshire, 3571. The village of St. Moritz is about a mile and a half from the baths; the waters of which are strongly chalybeate, with a large amount of free carbonic acid. They are taken internally and used as baths. The air is cold and bracing and stimulating; there are sudden changes of wind. In July, at night, the thermometer is often as low as 31° Fahr. The average temperature during January and February is 14°. The mean barometric pressure at the Kurhaus is 24 inches (on the English coast it is 30). The removal of one-fifth of the atmospheric pressure gives lightness and elasticity to the physical and mental feelings. The air is suitable to such as have a sluggish circulation and unexcitable nervous system. In the early stage of phthisis benefit has accrued from a residence in the neighbourhood of St. Moritz, even during winter. When accommodation cannot be got at St. Moritz, it may usually be obtained at one of the villages in the valley—at Samaden, Pontresina, or Silva-Plana. The Bernina Hotel, at Samaden, is open all the year round. Dr. Berry, at St. Moritz, receives patients. Dr. W. Bayes has strongly recommended (*Medical Times and Gazette*, p. 400, London, 3rd October, 1868) St. Moritz as a winter residence for cases where steady cold and extreme tenuity of air are indicated.

Baden, a few miles from Zurich, on the left bank of the Limmat, has several thermal gaseous springs. The temperature of the waters ranges from 117° to 122° Fahr., and the salts are in the proportion of 34 grs. to the 16 oz. The principal are, *chloride of sodium* (13), *sulphate of lime* (10), smaller quantities of the *carbonates of lime* and of *magnesia* and of *strontia*, *sulphate of soda*, and the *chlorides of potassium* and *magnesium*, &c. There are 22 cubic inches of *carbonic acid gas*. 125 of *nitrogen*, and an odour of *sulphuretted hydrogen*. The action of these waters is chiefly diuretic and constipating. They are recommended in gouty and rheumatic diseases, in chronic diarrhœa with congestion of the bowels, and in incipient phthisis. They are used internally, and externally as baths and douches. The climate of Baden being mild, invalids often remain throughout the winter.

Birmensdorf has bitter purgative waters resembling those of Püllna. They are cold (46° Fahr.), have only traces of carbonic acid gas, and their solid constituents slightly exceed 5 grs. in the 16 oz. They are used principally for exportation.

Schinznach, in the canton of Aargau, in a valley through which flows the Aar, five miles from Baden, is well known for its saline sulphurous thermal spring. The temperature of the waters is about 94° Fahr., the solid constituents being nearly 15 grs. in the 16 oz., with 1½ cubic inches of *carbonic acid gas*, and rather less of *sulphuretted hydrogen*. The chief salts are, *chloride of sodium* (5), *sulphate of lime* (4), *sulphate of magnesia* (2), *carbonate of lime* (1), *sulphate of soda* (1), with minute quantities of *carbonate of magnesia*, *alumina*, and *silicic acid*. The invalids both drink and bathe; the baths being used for twenty minutes at first, and afterwards for a longer time if necessary. The *poussée* is milder but appears more quickly than at Leuk. The waters have a reputation for relieving strumous and rheumatic affections, for curing skin diseases, and for healing callous spongy ulcers. The season lasts from the middle of May to the end of September. The climate is mild. Schinznach lies 1060 feet above the sea level.

WILDEGG, close to Schinznach, has been gaining repute for some few years as an iodated and bromated spa. The spring rises through an artesian well. The supply of water is scanty. The analysis of DR. LAUÉ shows the solid contents in 16 ounces to be 110 grains. The chief are, *chloride of sodium* (80), *chloride of magnesium* (12), *sulphate of lime* (14), with *iodide of sodium, bromide of sodium, chloride of strontium*, &c. There are nearly 2½ cubic inches of *carbonic acid gas*. These waters are recommended in strumous diseases, and in chronic glandular swellings.

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